User Manuals

EN

ZC - 24DI

CANopen I/O Module
24 Digital Input
Or
16 Digital input and 8 Counters (32 bit)

User Manual

Contents:

Features
PDOs
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PDOs MAPPING

OBJECTS FOR DEFAULT MAPPING				
PDO NR	COB-ID	MAPPED OBJECTS	INDEX	SUBINDEX
TPDO 1	0x40000180 + NodeId	Digital Input [1..8]	0x6000	1
		Digital Input [9..16]	0x6000	2
		Digital Input [17..24]	0x6000	3
		Overflow counter [1..8]	0x6000	4
TPDO 5	0x40000280 + NodeId	Counter 1 value	0x2210	1
		Counter 2 value	0x2210	2
TPDO 6	0x40000380 + NodeId	Counter 3 value	0x2210	3
		Counter 4 value	0x2210	4
TPDO 7	0x40000480 + NodeId	Counter 5 value	0x2210	5
		Counter 6 value	0x2210	6
TPDO 8	0x40000300 + NodeId	Counter 7 value	0x2210	7
		Counter 8 value	0x2210	8

Note that TPDO COB-ID must starts with 0x4

FEATURES

TECHNICAL DATA	
Baud rate	20, 50, 125, 250, 500, 800, 1000 Kbits/s
Counters Nr/Type	8 (32 bit) from input 1..8
Max frequency for Counters	10 kHz
Typical ON/OFF delay	1 ms (with filter disabled)
CANopen TECHNICAL DATA	
NMT	SLAVE
ERROR CONTROL	NODE GUARDING
NODE ID	HW SWITCH OR SOFTWARE
NUMBER OF PDO	5 TX
PDO MODES	Event Triggered, Sync (cyclic), Sync (acyclic)
PDO MAPPING	VARIABLE
PDO LINKING	SUPPORTED
NUMBER OF SDO	1 SERVER
ERROR MESSAGE	YES
SUPPORTED APPLICATION LAYER	CiA 301 v4.02
SUPPORTED PROFILE	CiA 401 v2.01

TPDO TRANSMISSIONS TYPE SUPPORTED

OBJECT VALUE 0x180x sub 2	TRANSMISSION TYPE
0	Synchronous - acyclic
From 1 to 240	Synchronous - cyclic
255	Asynchronous

EMERGENCY MESSAGE

The Emergency message is composed by:
2 bytes of EEC (Emergency Error Code)
1 byte of ER (Error register)
4 bytes of MEF (Manufacturer Error Filed Object 0x1002)

EMERGENCY MESSAGE						
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	**BYTE 5**	BYTE 6
EEC		ER	**MEF**			

EEC (Emergency Error Code)	
CODE	DESCRIPTION
0x0000	No Error
0x1000	Generic error
0x4201	CPU Temperature over T_HIGH_HIGH
0x4202	CPU Temperature over T_HIGH
0x4203	CPU Temperature under T_LOW
0x8110	Communication Can Overrun
0x8120	Error Passive
0x8130	Life Guard Error
0x8140	Recovered From Bus Off
0xFF20	CPU Error

ER (Error Register)							
BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT1	BIT 0
Generic	0	0	Temperature	Communication	0	0	Manifacture

Where if the bit is 0 means no error

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MANUFACTURER SPECIFIC PROFILE AREA

OBJECT 0x2001 NODE ADDRESS

If Hardware switches are in "from memory" mode the node address is selectable by object 0x2001.

NODE ADDRESS (Object 0x2001)	
OBJECT VALUE	DESCRIPTION
0..127	Node Address

OBJECT 0x2002 Baud Rate

If Hardware switches are in "from memory" mode the baud rate is selectable by object 0x2002.

BAUD RATE (Object 0x2002)	
OBJECT VALUE	DESCRIPTION
1	20 Kbit/s
2	50 Kbit/s
3	125 Kbit/s
4	250 Kbit/s
5	500 Kbit/s
6	800 Kbit/s
7	1 Mbit/s

OBJECT 0x2030 CPU TEMPERATURE

Object can be used for monitoring the CPU temperature. The HOT STOP Temperature sends in pre-operational the station.

The HOT ERROR and the COLD ERROR Temperature sends the Emergency Object.

The Object is Read Only.

CPU TEMPERATURE (Object 0x2030)	
SUBINDEX	DESCRIPTION
1	Actual Temperature [°C/10]
2	Temperature for HOT STOP ERROR [°C/10] 95.0°C
3	Temperature for HOT ERROR [°C/10] 90.0°C
4	Temperature for COLD ERROR [°C/10] -25.0°C

OBJECT 0x2051 CPU COMMAND

Object is used to send commands to the station module.

CPU COMMAND (OBJECT 0x2051)	
COMMAND CODE	DESCRIPTION
0x5C0n	Force the preset value (object 0x2211) for counter n
0x5D0n	Force the reset for counter n
0x5E0n	Force the overflow reset (object 0x6000 sub 4) for counter n

OBJECT 0x2200 Filters Parameters

Object is used to customize the input filter.

CPU COMMAND (OBJECT 0x2051)	
SUBINDEX	DESCRIPTION
1	Samples Number for filter (default 40)
2	Counter threshold for high level (default 20)
3	Counter threshold for low level (default 20)

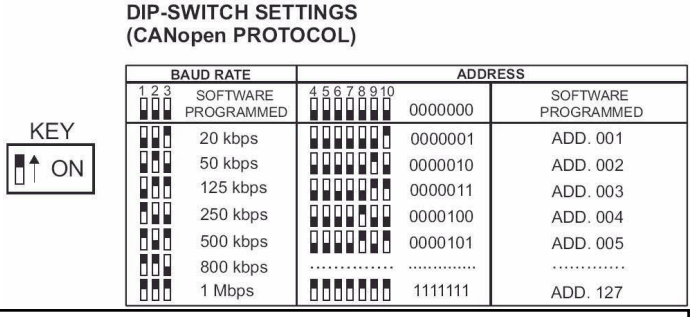
For a high level sample the filter counter is incremented, otherwise for a low level the filter counter is decremented.
When the filter counter is greater or equal subindex2 the input is stated "high".
When the filter counter is lower or equal subindex3 the input is stated "low".
In beetween subindex2 and subindex3 no state is asserted (dead zone).
Note that the filter can be disabled by selecting:
Subindex 1 = 1
Subindex 2 = 0
Subindex 3 = 0

OBJECT 0x2210 Digital Counters

Object 0x2210 Stores the values of the 8 counters in 32 bit format.

DIGITAL COUNTERS (OBJECT 0x2210)	
SUBINDEX	DESCRIPTION
1	Preset Counter 1 Value
2	Preset Counter 2 Value
3	Preset Counter 3 Value
4	Preset Counter 4 Value
5	Preset Counter 5 Value
6	Preset Counter 6 Value
7	Preset Counter 7 Value
8	Preset Counter 8 Value

DIP SWITCH CONFIGURATION



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LED DESCRIPTION

SERVICE LED DESCRIPTION		
LED	STATE	DESCRIPTION
RUN	BLINKING	Pre-operational mode
	SINGLE FLASH	Stop mode
	ON	Operational mode
ERROR	SINGLE FLASH	At least one error counter has reached or exceeded the warning level
	DOUBLE FLASH	Guard Event
	TRIPLE FLASH	The SYNC hasn't received within the configurated communication cycle time out period
	ON	The Can controller is BUS OFF
	OFF	No error
FAIL	ON/BLINKING	Data receiving
POWER	ON	Power Supply

INPUT LED DESCRIPTION		
LED	STATE	DESCRIPTION
1..8	ON	Input [1..8] is high
	OFF	Input [1..8] is low
9..24	ON	Input [9..24] is high
	OFF	Input [9..24] is low

DIGITAL INPUT MANAGEMENT

OBJECT 0x6003 INPUT FILTER CONFIGURATION

FILTER CONSTANT INPUT (Object 0x6003)	
SUBINDEX	DESCRIPTION
1	FILTER ENABLED FOR INPUT [1..8]
2	FILTER ENABLED FOR INPUT [9..16]
3	FILTER ENABLED FOR INPUT [17..24]

COUNTER MODE ON/OFF

If the value of object 0x6003 subindex 1 is "0" all inputs from 1 to 8 are configured in counter mode (counter mode switched on).

If the value of object 0x6003 subindex 1 is not equal to "0" The counter mode is switched off.

OBJECT 0x6005 INTERRUPT ENABLE

If the value is "1" the station can generate asynchronous TxPDO (DEFAULT).
If the value is "0" the station can't generate asynchronous TxPDO.

OBJECT 0x6007 INTERRUPT MASK LOW TO HIGH

DIGITAL INTERRUPT MASK LOW TO HIGH (OBJECT 0x6007)	
SUBINDEX	DESCRIPTION
1	Interrupt mask on rising edsge input [1..8]
2	Interrupt mask on rising edsge input [9..16]
3	Interrupt mask on rising edsge input [17..24]
4	Interrupt mask for counters overflow

For subindex form 1 to 3 if value is "1" than the generation of TxPDO on rising edge is enabled.

If subindex 4 value is "1" the generation of TxPDO on all 8 counters overflows is enabled.

OBJECT 0x6008 INTERRUPT MASK HIGH TO LOW

DIGITAL INTERRUPT MASK LOW TO HIGH (OBJECT 0x6007)	
SUBINDEX	DESCRIPTION
1	Interrupt mask on falling edsge input [1..8]
2	Interrupt mask on falling edsge input [9..16]
3	Interrupt mask on falling edsge input [17..24]

For subindex form 1 to 3 if value is "1" than the generation of TxPDO on falling edge is enabled.

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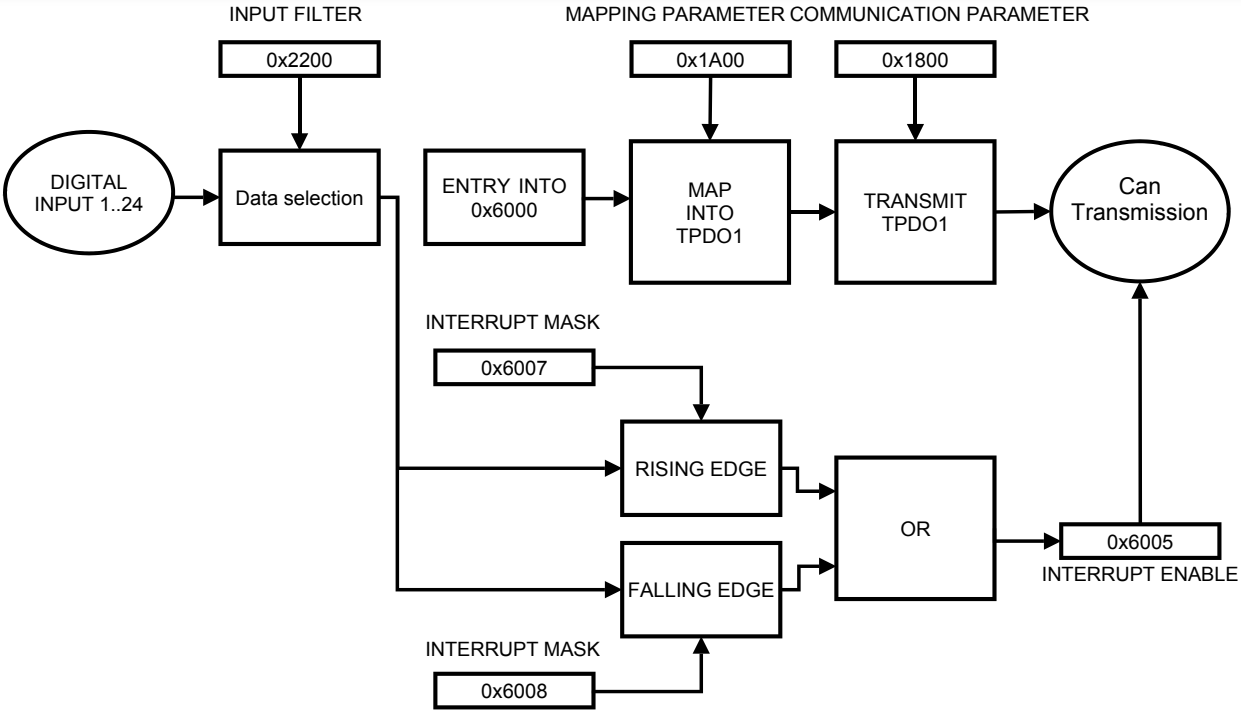
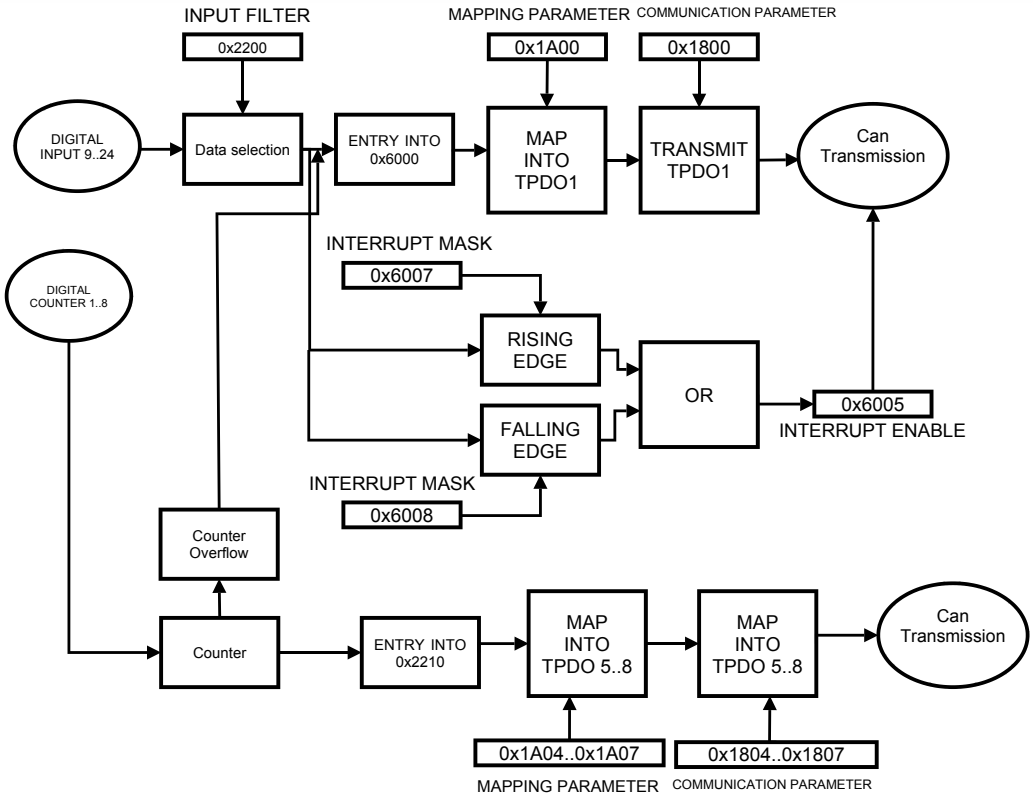
FUNCTIONAL DIAGRAM
COUNTER MODE OFF (DEFAULT)



FUNCTIONAL DIAGRAM
COUNTER MODE ON (Subindex 1 Object 0x6003 = "0")



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OBJECT DICTIONARY

COMMUNICATION PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1000	0	Device Type	Device Type (Profile 401 = 0x191)	UNSIGNED 32	RO	0x10191
0x1001	0	Error register	Error register (DS 401)	UNSIGNED 8	RO	0
0x1002	0	Manufacturer Status Register	Status Register	UNSIGNED 32	RO	0
0x1005	0	SYNC COB-ID	The device consumes the SYNC message	UNSIGNED 32	RW	0x80
0x1006	0	Communication Window Length	Sync interval [us]	UNSIGNED 32	RW	0
0x1007	0	Synchronous Window Length	Time window [us] for the PDO transmission after the SYNC	UNSIGNED 32	RW	0
0x1008	0	Manufacturer Device name	Device name	VISIBLE STRING	RO	“ZC-24DI”
0x1009	0	Manufacturer Hardware Version	Hardware version	VISIBLE STRING	RO	“SC000000”
0x100A	0	Manufacturer Software Version	Software version	VISIBLE STRING	RO	“SW001170”
0x100C	0	Guard Time	Guard Time [ms]	UNSIGNED 16	RW	0
0x100D	0	Life Time Factor	Max delay between two guarding telegrams = Guard_Time*Life_Time_Factor	UNSIGNED 8	RW	0
0x1010	0	Store Parameters	Max Subindex Number		RO	4
	1	Save All Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	2	Save Communication Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	3	Save Application Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	4	Save Manufacturer Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
0x1011	0	Restore Default	Max Subindex Number	UNSIGNED 8	RO	4
	1	Restore All Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	2	Restore Communication Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	3	Restore Application Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	4	Restore Manufactures Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1014	0	COB-ID Emergency Object	COB-ID for Emergency Object	UNSIGNED 32	RO	NODEID+0x80
0x1018	0	Identity Object	Max Subindex Number	UNSIGNED 8	RO	4
	1	Vendor ID	Seneca srl	UNSIGNED 32	RO	0x00000249
	2	Product Code	ZC-24DI Machine ID Code	UNSIGNED 32	RO	0x00000020
	3	Revision Number	Revision	UNSIGNED 32	RO	0
	4	Serial Number	Serial Number Code	UNSIGNED 32	RO	0
0x1200	0	Server SDO Parameters	Max Subindex Number	UNSIGNED 8	RO	2
	1	Receive SDO COB-ID	COB-ID of Receive SDO	UNSIGNED 32	RO	NODEID + 0x600
	2	Transmit SDO COB-ID	COB-ID of Transmit SDO	UNSIGNED 32	RO	NODEID + 0x580
0x1800	0	Transmit PDO1 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO1	UNSIGNED 32	RW	NODEID + 0x40000180
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1804	0	Transmit PDO5 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO5	UNSIGNED 32	RW	NODEID + 0x40000280
	2	Transmission Type	Transmission Type for TxPDO5 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0x01
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1805	0	Transmit PDO6 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO6	UNSIGNED 32	RW	NODEID + 0x40000380
	2	Transmission Type	Transmission Type for TxPDO6 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0x01
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1806	0	Transmit PDO7 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO7	UNSIGNED 32	RW	NODEID + 0x40000480
	2	Transmission Type	Transmission Type for TxPDO7 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0x01

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
	3	Inhibit Time	Min. delay for transmit the next TxPDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1807	0	Transmit PDO8 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO8	UNSIGNED 32	RW	NODEID + 0x40000300
	2	Transmission Type	Transmission Type for TxPDO8 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0x01
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1A00	0	Transmit PDO1 Mapping	Max Subindex Number	UNSIGNED 8	RO	4
	1	Object NR1	First Object (default:: Input 1..8)	UNSIGNED 32	RW	0x60000108 Object = 0x6000 subindex = 1 Length = 8 bit
	2	Object NR2	Second Object (default:: Input 9..16)	UNSIGNED 32	RW	0x60000208 Object = 0x6000 subindex = 2 Length = 8 bit
	3	Object NR3	Third Object (default:: Input 17..24)	UNSIGNED 32	RW	0x60000308 Object = 0x6000 subindex = 3 Length = 8 bit
	4	Object NR4	Fourth Object (default:: Counter Overflow)	UNSIGNED 32	RW	0x60000408 Object = 0x6000 subindex = 4 Length = 8 bit
0x1A04	0	Transmit PDO5 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default:: Counter 1)	UNSIGNED 32	RW	0x22100120 Object = 0x2210 subindex = 1 Length = 32 bit
	2	Object NR2	Second Object (default:: Counter 2)	UNSIGNED 32	RW	0x22100220 Object = 0x2210 subindex = 2 Length = 32 bit
0x1A05	0	Transmit PDO6 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default:: Counter 3)	UNSIGNED 32	RW	0x22100320 Object = 0x2210 subindex = 3 Length = 32 bit
	2	Object NR2	Second Object (default:: Counter 4)	UNSIGNED 32	RW	0x22100420 Object = 0x2210 subindex = 4 Length = 32 bit
0x1A06	0	Transmit PDO7 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default: Counter 5)	UNSIGNED 32	RW	0x22100520 Object = 0x2210 subindex = 5 Length = 32 bit
	2	Object NR2	Second Object (default: Counter 6)	UNSIGNED 32	RW	0x22100620 Object = 0x2210 subindex = 6 Length = 32 bit

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1A07	0	Transmit PDO8 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default:: Counter 7)	UNSIGNED 32	RW	0x22100720 Object = 0x2210 subindex = 7 Length = 32 bit
	2	Object NR2	Second Object (default:: Counter 8)	UNSIGNED 32	RW	0x22100820 Object = 0x2210 subindex = 8 Length = 32 bit

MANUFACTURER SPECIFIC PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2001	0	Module Address	Station Address (only if dip switch 4,5,6,7,8,9,10 are OFF)	UNSIGNED 8	RW	127
0x2002	0	Buad Rate	Station Baud Rate (only if dip switch 1,2,3 are OFF) 1 = 20Kbps 2 = 50Kbps 3 = 125Kbps 4 = 250Kbps 5 = 500Kbps 6 = 800Kbps 7 = 1Mbps	UNSIGNED 8	RW	7
0x2030	0	Device Temperature	Max Subindex Number	UNSIGNED 8	RO	4
	1	Internal Temperatue	Station internal Temperature [°C/10]	INTEGER 16	RO	0
	2	Hi Hi Temperature	Critical Hot Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	950
	3	Hi Temperature	Warning for Too Hot Temperature [°C/10]	INTEGER 16	RO	900
	4	Lo Temperature	Critical Low Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	-250
0x2051	0	CPU Command	Command to execute Supported commands are: 0x5C0n Force preset for counter n 0x5D0n Force counter n reset 0x5E0n Force overflow for counter n	UNSIGNED 16	RW	0
0x2052	0	Aux Command	Reserved	UNSIGNED 16	RW	0
0x2200	0	Input Filter Parameter	Max Subindex Number	UNSIGNED 8	RO	3
	1	Filter Length	Number of samples to evaluate	UNSIGNED 8	RW	40
	2	Counter threshold for high level	If counter >= threshold_high input is stated “high”	UNSIGNED 8	RW	20
	3	Counter threshold for low level	If counter <= threshold_low input is stated “low”	UNSIGNED 8	RW	20

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2210	0	Input Counters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Counter 1 Value	Counter 1 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	2	Counter 2 Value	Counter 2 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	3	Counter 3 Value	Counter 3 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	4	Counter 4 Value	Counter 4 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	5	Counter 5 Value	Counter 5 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	6	Counter 6 Value	Counter 6 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	7	Counter 7 Value	Counter 7 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	8	Counter 8 Value	Counter 8 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
0x2211	0	Preset for Input Counters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Counter 1 Preset Value	Counter 1 preset value	UNSIGNED 32	RW	0
	2	Counter 2 Preset Value	Counter 2 preset value	UNSIGNED 32	RW	0
	3	Counter 3 Preset Value	Counter 3 preset value	UNSIGNED 32	RW	0
	4	Counter 4 Preset Value	Counter 4 preset value	UNSIGNED 32	RW	0
	5	Counter 5 Preset Value	Counter 5 preset value	UNSIGNED 32	RW	0
	6	Counter 6 Preset Value	Counter 6 preset value	UNSIGNED 32	RW	0
	7	Counter 7 Preset Value	Counter 7 preset value	UNSIGNED 32	RW	0
	8	Counter 8 Preset Value	Counter 8 preset value	UNSIGNED 32	RW	0

STANDARD DEVICE PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6000	0	8 bit Digital Input / Counter 1 overflow	Max Subindex Number	UNSIGNED 8	RO	4
	1	Input [1..8] Value	Read input [1..8] value	UNSIGNED 8	RO	0
	2	Input [9..16] Value	Read input [9..16] value	UNSIGNED 8	RO	0
	3	Input [17..24] Value	Read input [17..24] value	UNSIGNED 8	RO	0
	4	Counter [1..8] Overflow	Overflow Status Counter [1..8]	UNSIGNED 8	RO	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6003	0	Filter Mask enable	Max Subindex Number	UNSIGNED 8	RO	3
	1	Input [1..8] Filter Mask Enable	Input [1..8] Filter enable Mask bit 0 = Filter disabled (and Counters 1..8 Enabled) Mask bit 1 = Filter enabled (and Counters 1..8 Disabled)	UNSIGNED 8	RW	0xFF
	2	Input [9..16] Filter Mask Enable	Input [9..16] Filter enable Mask bit 0 = Filter disabled Mask bit 1 = Filter enabled	UNSIGNED 8	RW	0xFF
	3	Input [17..24] Filter Mask Enable	Input [17..24] Filter enable Mask bit 0 = Filter disabled Mask bit 1 = Filter enabled	UNSIGNED 8	RW	0xFF
0x6005	0	Global Interrupt Enabled	0 = TxPDO Asynchronous disabled 1 = TxPDO Asynchronous enabled	UNSIGNED 8	RW	1
0x6007	0	Interrupt Mask Low to High	Max Subindex Number	UNSIGNED 8	RO	4
	1	Input [1..8] interrupt Low to High mask enable	Input [1..8] rising interrupt mask enable Mask bit 0 = rising interrupt disabled Mask bit 1 = rising interrupt enabled	UNSIGNED 8	RW	0xFF
	2	Input [9..16] interrupt Low to High mask enable	Input [9..16] rising interrupt enable Mask bit 0 = rising interrupt disabled Mask bit 1 = rising interrupt enabled	UNSIGNED 8	RW	0xFF
	3	Input [17..24] interrupt Low to High mask enable	Input [17..24] rising interrupt enable Mask bit 0 = rising interrupt disabled Mask bit 1 = rising interrupt enabled	UNSIGNED 8	RW	0xFF
	4	Counter [1..8] Overflow interrupt mask enable	Counter [1..8] rising interrupt mask enable Mask bit 0 = rising interrupt disabled Mask bit 1 = rising interrupt enabled	UNSIGNED 8	RW	0xFF
0x6008	0	Interrupt Mask High to Low	Max Subindex Number	UNSIGNED 8	RO	3
	1	Input [1..8] interrupt High to Low mask enable	Input [1..8] falling interrupt mask enable Mask bit 0 = falling interrupt disabled Mask bit 1 = falling interrupt enabled	UNSIGNED 8	RW	0xFF
	2	Input [9..16] interrupt High to Low mask enable	Input [9..16] falling interrupt enable Mask bit 0 = falling interrupt disabled Mask bit 1 = falling interrupt enabled	UNSIGNED 8	RW	0xFF
	3	Input [17..24] interrupt High to Low mask enable	Input [17..24] falling interrupt enable Mask bit 0 = falling interrupt disabled Mask bit 1 = falling interrupt enabled	UNSIGNED 8	RW	0xFF

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6020	0	Read Input 1 Bit	Max Subindex Number	UNSIGNED 8	RO	24
	1	Input 1 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	2	Input 2 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	3	Input 3 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	4	Input 4 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	5	Input 5 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	6	Input 6 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	7	Input 7 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	8	Input 8 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	9	Input 9 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	10	Input 10 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	11	Input 11 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	12	Input 12 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	13	Input 13 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	14	Input 14 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	15	Input 15 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	16	Input 16 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	17	Input 17 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	18	Input 18 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	19	Input 19 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	20	Input 20 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	21	Input 21 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	22	Input 22 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	23	Input 23 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	24	Input 24 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0

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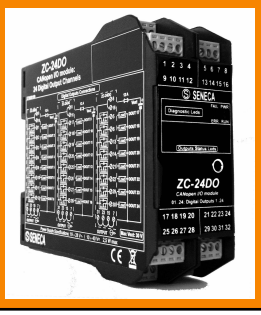
EN

ZC - 24DO

CANopen I/O Module
24 Digital Output

User Manual



Contents:

Features
PDOs
PDO Transmission Type
Emergency Message
Functional Diagrams
Object Dictionary

PDOs MAPPING

OBJECTS FOR DEFAULT MAPPING				
PDO NR	COB-ID	MAPPED OBJECTS	INDEX	SUBINDEX
RPDO 1	0x200 + NodeId	Digital Output [1..8]	0x6200	1
		Digital Output [9..16]	0x6200	2
		Digital Output [17..24]	0x6200	3

FEATURES

TECHNICAL DATA	
Baud rate	20, 50, 125, 250, 500, 800, 1000 Kbits/s
Typical ON/OFF delay	1.25 ms
CANopen TECHNICAL DATA	
NMT	SLAVE
ERROR CONTROL	NODE GUARDING
NODE ID	HW SWITCH OR SOFTWARE
NUMBER OF PDO	1 RX
PDO MODES	Event Triggered, Sync (cyclic), Sync (acyclic)
PDO MAPPING	VARIABLE
PDO LINKING	SUPPORTED
NUMBER OF SDO	1 SERVER
ERROR MESSAGE	YES
SUPPORTED APPLICATION LAYER	CiA 301 v4.02
SUPPORTED PROFILE	CiA 401 v2.01

PDO TRANSMISSIONS TYPE SUPPORTED

OBJECT VALUE 0x180x sub 2	TRANSMISSION TYPE
0	Synchronous - acyclic
From 1 to 240	Synchronous - cyclic
255	Asynchronous

EMERGENCY MESSAGE

The Emergency message is composed by:
2 bytes of EEC (Emergency Error Code)
1 byte of ER (Error register)
4 bytes of MEF (Manufacturer Error Filed Object 0x1002)

EMERGENCY MESSAGE						
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	**BYTE 5**	BYTE 6
EEC		ER	**MEF**			

EEC (Emergency Error Code)	
CODE	DESCRIPTION
0x0000	No Error
0x1000	Generic error
0x4201	CPU Temperature over T_HIGH_HIGH
0x4202	CPU Temperature over T_HIGH
0x4203	CPU Temperature under T_LOW
0x8110	Communication Can Overrun
0x8120	Error Passive
0x8130	Life Guard Error
0x8140	Recovered From Bus Off
0xFF20	CPU Error
0xFF30	Vext For outputs not found / SPI Communication Error
0xFF50	Output Fail

ER (Error Register)							
BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT1	BIT 0
Generic	0	0	Temperature	Communication	0	0	Manifacture

Where if the bit is 0 means no error

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MANUFACTURER SPECIFIC PROFILE AREA

OBJECT 0x2001 NODE ADDRESS

If Hardware switches are in "from memory" mode the node address is selectable by object 0x2001.

NODE ADDRESS (Object 0x2001)	
OBJECT VALUE	DESCRIPTION
0..127	Node Address

OBJECT 0x2002 Baud Rate

If Hardware switches are in "from memory" mode the baud rate is selectable by object 0x2002.

BAUD RATE (Object 0x2002)	
OBJECT VALUE	DESCRIPTION
1	20 Kbit/s
2	50 Kbit/s
3	125 Kbit/s
4	250 Kbit/s
5	500 Kbit/s
6	800 Kbit/s
7	1 Mbit/s

OBJECT 0x2030 CPU TEMPERATURE

Object can be used for monitoring the CPU temperature. The HOT STOP Temperature sends in pre-operational the station.

The HOT ERROR and the COLD ERROR Temperature sends the Emergency Object.

The Object is Read Only.

CPU TEMPERATURE (Object 0x2030)	
SUBINDEX	DESCRIPTION
1	Actual Temperature [°C/10]
2	Temperature for HOT STOP ERROR [°C/10] 95.0°C
3	Temperature for HOT ERROR [°C/10] 90.0°C
4	Temperature for COLD ERROR [°C/10] -25.0°C

OBJECT 0x2520 OUTPUT STATUS

Object can be used for monitoring the outputs status:
"1" = Output status ERROR
"0" = Output status OK

OUTPUT STATUS (Object 0x2520)	
SUBINDEX	DESCRIPTION
1	OUTPUT [1..8] STATUS
2	OUTPUT [9..16] STATUS
3	OUTPUT [17..24] STATUS

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LED DESCRIPTION

SERVICE LED DESCRIPTION		
LED	**STATE**	**DESCRIPTION**
RUN	BLINKING	Pre-operational mode
	SINGLE FLASH	Stop mode
	ON	Operational mode
ERROR	SINGLE FLASH	At least one error counter has reached or exceeded the warning level
	DOUBLE FLASH	Guard Event
	TRIPLE FLASH	The SYNC hasn't received within the configurated communication cycle time out period
	ON	The Can controller is BUS OFF
	OFF	No error
FAIL	ON/BLINKING	No Vext Found / Data receiving
POWER	ON	Power Supply

INPUT/OUTPUT LED DESCRIPTION		
LED	**STATE**	**DESCRIPTION**
1..8	ON	Output [1..8] is high
	OFF	Ouput [1..8] is low
9..16	ON	Output [9..16] is high
	OFF	Ouput [9..16] is low
17..24	ON	Output [17..24] is high
	OFF	Ouput [17..24] is low

DIP SWITCH CONFIGURATION

DIP-SWITCH SETTINGS
(CANopen PROTOCOL)

KEY

BAUD RATE		ADDRESS		
1 2 3	SOFTWARE PROGRAMMED	4 5 6 7 8 9 10		SOFTWARE PROGRAMMED
	20 kbps		0000001	ADD. 001
	50 kbps		0000010	ADD. 002
	125 kbps		0000011	ADD. 003
	250 kbps		0000100	ADD. 004
	500 kbps		0000101	ADD. 005
	800 kbps	.....	.....	.....
	1 Mbps		1111111	ADD. 127

DIGITAL OUTPUT MANAGEMENT

OBJECT 0x6200
8 BIT OUTPUT

8 BIT OUTPUT (Object 0x6200)	
SUBINDEX	DESCRIPTION
1	OUTPUT [1..8] VALUE
2	OUTPUT [9..16] VALUE
3	OUTPUT [17..24] VALUE

OBJECT 0x6206
ERROR MODE OUTPUT

ERROR MODE OUTPUT (Object 0x6206)	
SUBINDEX	DESCRIPTION
1	OUTPUT [1..8] ERROR MODE
2	OUTPUT [9..16] ERROR MODE
3	OUTPUT [17..24] ERROR MODE

In Error:
0 = the output keeps the last value
1 = the output is loaded with object 0x6207

OBJECT 0x6207
ERROR VALUE OUTPUT

ERROR VALUE OUTPUT (Object 0x6207)	
SUBINDEX	DESCRIPTION
1	OUTPUT [1..8] ERROR VALUE
2	OUTPUT [9..16] ERROR VALUE
3	OUTPUT [17..24] ERROR VALUE

The object stores the outputs values to load in fault case (only if the Error mode output corresponding bit value is "1").

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OBJECT 0x6220
SINGLE BIT OUTPUT

ERROR VALUE OUTPUT (Object 0x6220)	
SUBINDEX	DESCRIPTION
1	OUTPUT 1 VALUE
2	OUTPUT 2 VALUE
3	OUTPUT 3 VALUE
4	OUTPUT 4 VALUE
5	OUTPUT 5 VALUE
6	OUTPUT 6 VALUE
7	OUTPUT 7 VALUE
8	OUTPUT 8 VALUE
9	OUTPUT 9 VALUE
10	OUTPUT 10 VALUE
11	OUTPUT 11 VALUE
12	OUTPUT 12 VALUE
13	OUTPUT 13 VALUE
14	OUTPUT 14 VALUE
15	OUTPUT 15 VALUE
16	OUTPUT 16 VALUE
17	OUTPUT 17 VALUE
18	OUTPUT 18 VALUE
19	OUTPUT 19 VALUE
20	OUTPUT 20 VALUE
21	OUTPUT 21 VALUE
22	OUTPUT 22 VALUE
23	OUTPUT 23 VALUE
24	OUTPUT 24 VALUE

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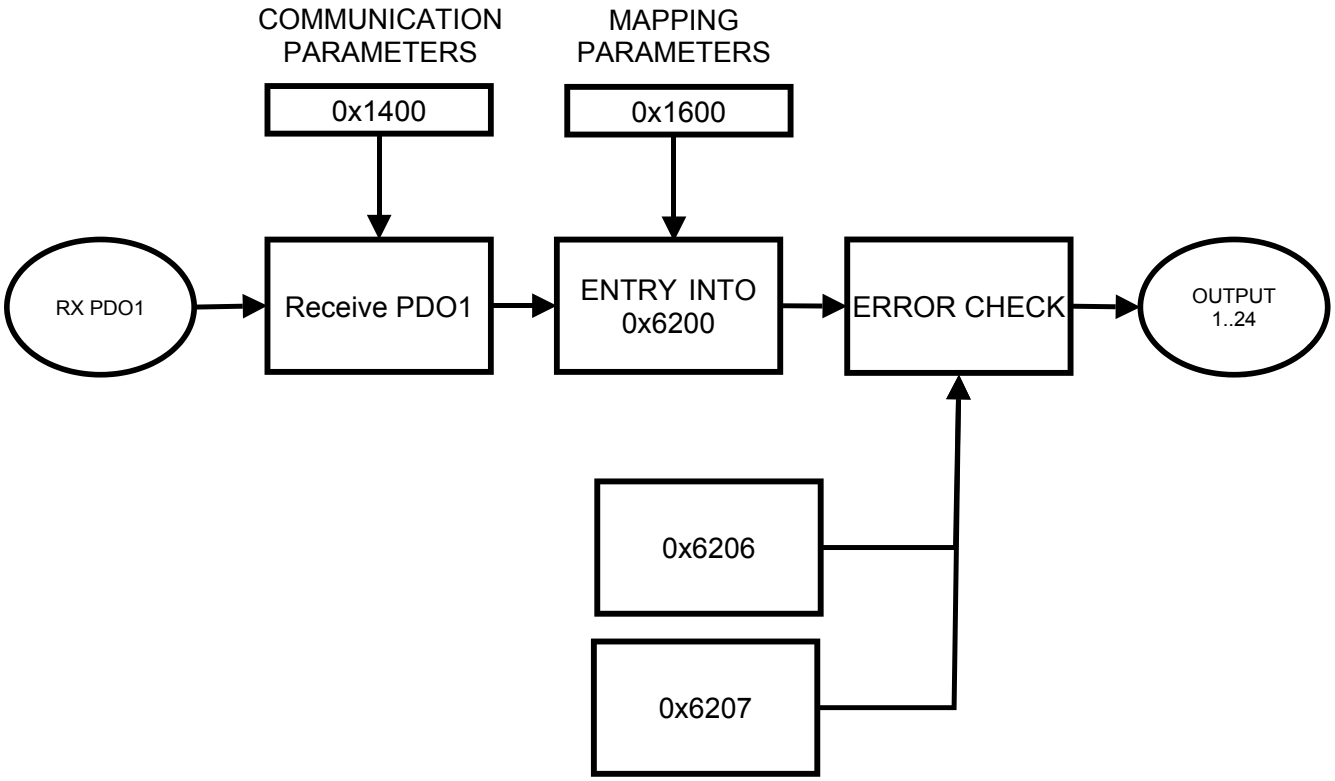
FUNCTIONAL DIAGRAM
DIGITAL OUTPUT



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OBJECT DICTIONARY

COMMUNICATION PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1000	0	Device Type	Device Type (Profile 401 = 0x191)	UNSIGNED 32	RO	0x00030191
0x1001	0	Error register	Error register (DS 401)	UNSIGNED 8	RO	0
0x1002	0	Manufacturer Status Register	Status Register	UNSIGNED 32	RO	0
0x1005	0	SYNC COB-ID	The device consumes the SYNC message	UNSIGNED 32	RW	0x80
0x1006	0	Communication Window Length	Sync interval [us]	UNSIGNED 32	RW	0
0x1007	0	Synchronous Window Length	Time window [us] for the PDO transmission after the SYNC	UNSIGNED 32	RW	0
0x1008	0	Manufacturer Device name	Device name	VISIBLE STRING	RO	"ZC-24DO"
0x1009	0	Manufacturer Hardware Version	Hardware version	VISIBLE STRING	RO	“SC000000”
0x100A	0	Manufacturer Software Version	Software version	VISIBLE STRING	RO	"SW001170"
0x100C	0	Guard Time	Guard Time [ms]	UNSIGNED 16	RW	0
0x100D	0	Life Time Factor	Max delay between two guarding telegrams = Guard_Time*Life_Time_Factor	UNSIGNED 8	RW	0
0x1010	0	Store Parameters	Max Subindex Number		RO	4
	1	Save All Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	2	Save Communication Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	3	Save Application Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	4	Save Manufacturer Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
0x1011	0	Restore Default	Max Subindex Number	UNSIGNED 8	RO	4
	1	Restore All Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	2	Restore Communication Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	3	Restore Application Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
	4	Restore Manufactures Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
0x1014	0	COB-ID Emergency Object	COB-ID for Emergency Object	UNSIGNED 32	RO	NODEID+0x80
0x1018	0	Identity Object	Max Subindex Number	UNSIGNED 8	RO	4
	1	Vendor ID	Seneca srl	UNSIGNED 32	RO	0x00000249
	2	Product Code	ZC-24DO Machine ID Code	UNSIGNED 32	RO	0x00000021
	3	Revision Number	Revision	UNSIGNED 32	RO	0
	4	Serial Number	Serial Number Code	UNSIGNED 32	RO	0
0x1200	0	Server SDO Parameters	Max Subindex Number	UNSIGNED 8	RO	2
	1	Receive SDO COB-ID	COB-ID of Receive SDO	UNSIGNED 32	RO	NODEID + 0x600
	2	Transmit SDO COB-ID	COB-ID of Transmit SDO	UNSIGNED 32	RO	NODEID + 0x580
0x1400	0	Receive PDO1 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO1	UNSIGNED 32	RW	NODEID + 0x200
	2	Transmission Type	Transmission Type for RxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Not used in Rx PDO	UNSIGNED 16	RW	0x0000
0x1600	0	Receive PDO1 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	Object NR1	First Object (default:Output 1..8)	UNSIGNED 32	RW	0x62000108 Object = 0x6200 subindex = 1 Length = 8 bit
	2	Object NR2	Second Object (default:Output 9..16)	UNSIGNED 32	RW	0x62000208 Object = 0x6200 subindex = 2 Length = 8 bit
	3	Object NR3	Third Object (default:Output 17..24)	UNSIGNED 32	RW	0x62000308 Object = 0x6200 subindex = 3 Length = 8 bit

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MANUFACTURER SPECIFIC PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2001	0	Module Address	Station Address (only if dip switch 4,5,6,7,8,9,10 are OFF)	UNSIGNED 8	RW	127
0x2002	0	Buad Rate	Station Baud Rate (only if dip switch 1,2,3 are OFF) 1 = 20Kbps 2 = 50Kbps 3 = 125Kbps 4 = 250Kbps 5 = 500Kbps 6 = 800Kbps 7 = 1Mbps	UNSIGNED 8	RW	7
0x2030	0	Device Temperature	Max Subindex Number	UNSIGNED 8	RO	4
	1	Internal Temperatue	Station internal Temperature [°C/10]	INTEGER 16	RO	0
	2	Hi Hi Temperature	Critical Hot Temperature (All operations Stop)[°C/10]	INTEGER 16	RO	950
	3	Hi Temperature	Warning for Too Hot Temperature [°C/10]	INTEGER 16	RO	900
	4	Lo Temperature	Critical Low Temperature (All operations Stop)[°C/10]	INTEGER 16	RO	-250
0x2051	0	CPU Command	Command to execute Supported commands are: 0x5C0n Force preset for counter n 0x5D0n Force counter n reset 0x5E0n Force overflow for counter n	UNSIGNED 16	RW	0
0x2052	0	Aux Command	Reserved	UNSIGNED 16	RW	0
0x2520	0	Outputs Status	Max Subindex Number	UNSIGNED 8	RO	3
	1	Output [1..8] Status	1 = Output status ERROR 0 = Output status OK	UNSIGNED 8	RO	0
	2	Output [9..16] Status	1 = Output status ERROR 0 = Output status OK	UNSIGNED 8	RO	0
	3	Output [17..24] Status	1 = Output status ERROR 0 = Output status OK	UNSIGNED 8	RO	0
0x2521	0	Output Fail type	Max Subindex Number	UNSIGNED 8	RO	3
	1	Fail Type Output [1..8]	Reserved	UNSIGNED 8	RO	0
	2	Fail Type Output [9..16]	Reserved	UNSIGNED 8	RO	0
	3	Fail Type Output [17..24]	Reserved	UNSIGNED 8	RO	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6200	0	8 bit Output	Max Subindex Number	UNSIGNED 8	RO	1
	1	Output 1..8 Value	Output value	UNSIGNED 8	RW	0
	2	Output 9..16 Value	Output value	UNSIGNED 8	RW	0
	3	Output 17..24 Value	Output value	UNSIGNED 8	RW	0
0x6206	0	Error Mode Output	Max Subindex Number	UNSIGNED 8	RO	1
	1	Error Mode Output [1..8]	“1” = Load 0x6207 value “0” = Keep last	UNSIGNED 8	RW	0xFF
	2	Error Mode Output [9..16]	“1” = Load 0x6207 value “0” = Keep last	UNSIGNED 8	RW	0xFF
	3	Error Mode Output [17..24]	“1” = Load 0x6207 value “0” = Keep last	UNSIGNED 8	RW	0xFF
0x6207	0	Error Value Output	Max Subindex Number	UNSIGNED 8	RO	1
	1	Error value Output [1..8]	Value to Load in fail case	UNSIGNED 8	RW	0x00
	2	Error value Output [9..16]	Value to Load in fail case	UNSIGNED 8	RW	0x00
	3	Error value Output [17..24]	Value to Load in fail case	UNSIGNED 8	RW	0x00
0x6220	0	Single Bit Output	Max Subindex Number	UNSIGNED 8	RO	8
	1	Output 1 Value	Output 1	BOOLEAN	RW	0
	2	Output 2 Value	Output 2	BOOLEAN	RW	0
	3	Output 3 Value	Output 3	BOOLEAN	RW	0
	4	Output 4 Value	Output 4	BOOLEAN	RW	0
	5	Output 5 Value	Output 5	BOOLEAN	RW	0
	6	Output 6 Value	Output 6	BOOLEAN	RW	0
	7	Output 7 Value	Output 7	BOOLEAN	RW	0
	8	Output 8 Value	Output 8	BOOLEAN	RW	0
	9	Output 9 Value	Output 9	BOOLEAN	RW	0
	10	Output 10 Value	Output 10	BOOLEAN	RW	0
	11	Output 11 Value	Output 11	BOOLEAN	RW	0
	12	Output 12 Value	Output 12	BOOLEAN	RW	0
	13	Output 13 Value	Output 13	BOOLEAN	RW	0
	14	Output 14 Value	Output 14	BOOLEAN	RW	0
	15	Output 15 Value	Output 15	BOOLEAN	RW	0
	16	Output 16 Value	Output 16	BOOLEAN	RW	0
	17	Output 17 Value	Output 17	BOOLEAN	RW	0
	18	Output 18 Value	Output 18	BOOLEAN	RW	0
	19	Output 19 Value	Output 19	BOOLEAN	RW	0
	20	Output 20 Value	Output 20	BOOLEAN	RW	0
	21	Output 21 Value	Output 21	BOOLEAN	RW	0
	22	Output 22 Value	Output 22	BOOLEAN	RW	0
	23	Output 23 Value	Output 23	BOOLEAN	RW	0
	24	Output 24 Value	Output 24	BOOLEAN	RW	0

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EN

ZC - 16DI8DO

CANopen I/O Module
16 Digital Input
8 Digital Output
Or
8 Counters (32 bit)
8 Digital input
8 Digital output

User Manual

Contents:

Features
PDOs
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PDOs MAPPING

OBJECTS FOR DEFAULT MAPPING				
PDO NR	COB-ID	MAPPED OBJECTS	INDEX	SUBINDEX
RPDO 1	0x200 + NodeId	Digital Input [1..8]	0x6200	1
TPDO 1	0x40000180 + NodeId	Digital Input [1..8]	0x6000	1
		Digital Input [9..16]	0x6000	2
		Overflow counter [1..8]	0x6000	3
TPDO 5	0x40000280 + NodeId	Counter 1 value	0x2210	1
		Counter 2 value	0x2210	2
TPDO 6	0x40000380 + NodeId	Counter 3 value	0x2210	3
		Counter 4 value	0x2210	4
TPDO 7	0x40000480 + NodeId	Counter 5 value	0x2210	5
		Counter 6 value	0x2210	6
TPDO 8	0x40000300 + NodeId	Counter 7 value	0x2210	7
		Counter 8 value	0x2210	8

Note that TPDO COB-ID must starts with 0x4

FEATURES

TECHNICAL DATA	
Baud rate	20, 50, 125, 250, 500, 800, 1000 Kbits/s
Counters Nr/Type	8 (32 bit) from input 1..8
Max frequency for Counters	10 kHz
Typical ON/OFF delay	1 ms (with filter disabled) for inputs 1.25 ms for outputs
CANopen TECHNICAL DATA	
NMT	SLAVE
ERROR CONTROL	NODE GUARDING
NODE ID	HW SWITCH OR SOFTWARE
NUMBER OF PDO	5 TX, 1 RX
PDO MODES	Event Triggered, Sync (cyclic), Sync (acyclic)
PDO MAPPING	VARIABLE
PDO LINKING	SUPPORTED
NUMBER OF SDO	1 SERVER
ERROR MESSAGE	YES
SUPPORTED APPLICATION LAYER	CiA 301 v4.02
SUPPORTED PROFILE	CiA 401 v2.01

EMERGENCY MESSAGE

The Emergency message is composed by:
2 bytes of EEC (Emergency Error Code)
1 byte of ER (Error register)
4 bytes of MEF (Manufacturer Error Filed Object 0x1002)

EMERGENCY MESSAGE						
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	**BYTE 5**	BYTE 6
EEC		ER	**MEF**			

EEC (Emergency Error Code)	
CODE	DESCRIPTION
0x0000	No Error
0x1000	Generic error
0x4201	CPU Temperature over T_HIGH_HIGH
0x4202	CPU Temperature over T_HIGH
0x4203	CPU Temperature under T_LOW
0x8110	Communication Can Overrun
0x8120	Error Passive
0x8130	Life Guard Error
0x8140	Recovered From Bus Off
0xFF20	CPU Error
0xFF30	Vext For outputs not found / SPI Communication Error
0xFF50	Output Fail

ER (Error Register)							
BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT1	BIT 0
Generic	0	0	Temperature	Communication	0	0	Manifacture

Where if the bit is 0 means no error

TPDO TRANSMISSIONS TYPE SUPPORTED

OBJECT VALUE 0x180x sub 2	TRANSMISSION TYPE
0	Synchronous - acyclic
From 1 to 240	Synchronous - cyclic
255	Asynchronous

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MANUFACTURER SPECIFIC PROFILE AREA

OBJECT 0x2001 NODE ADDRESS

If Hardware switches are in "from memory" mode the node address is selectable by object 0x2001.

NODE ADDRESS (Object 0x2001)	
OBJECT VALUE	DESCRIPTION
0..127	Node Address

OBJECT 0x2002 Baud Rate

If Hardware switches are in "from memory" mode the baud rate is selectable by object 0x2002.

BAUD RATE (Object 0x2002)	
OBJECT VALUE	DESCRIPTION
1	20 Kbit/s
2	50 Kbit/s
3	125 Kbit/s
4	250 Kbit/s
5	500 Kbit/s
6	800 Kbit/s
7	1 Mbit/s

OBJECT 0x2030 CPU TEMPERATURE

Object can be used for monitoring the CPU temperature. The HOT STOP Temperature sends in pre-operational the station.

The HOT ERROR and the COLD ERROR Temperature sends the Emergency Object.

The Object is Read Only.

CPU TEMPERATURE (Object 0x2030)	
SUBINDEX	DESCRIPTION
1	Actual Temperature [°C/10]
2	Temperature for HOT STOP ERROR [°C/10] 95.0°C
3	Temperature for HOT ERROR [°C/10] 90.0°C
4	Temperature for COLD ERROR [°C/10] -25.0°C

OBJECT 0x2051 CPU COMMAND

Object is used to send commands to the station module.

CPU COMMAND (OBJECT 0x2051)	
COMMAND CODE	DESCRIPTION
0x5C0n	Force the preset value (object 0x2211) for counter n
0x5D0n	Force the reset for counter n
0x5E0n	Force the overflow reset (object 0x6000 sub 4) for counter n

OBJECT 0x2200 Filters Parameters

Object is used to customize the input filter.

CPU COMMAND (OBJECT 0x2051)	
SUBINDEX	DESCRIPTION
1	Samples Number for filter (default 40)
2	Counter threshold for high level (default 20)
3	Counter threshold for low level (default 20)

For a high level sample the filter counter is incremented, otherwise for a low level the filter counter is decremented.
When the filter counter is greater or equal subindex2 the input is stated "high".
When the filter counter is lower or equal subindex3 the input is stated "low".
In beetween subindex2 and subindex3 no state is asserted (dead zone).
Note that the filter can be disabled by selecting:
Subindex 1 = 1
Subindex 2 = 0
Subindex 3 = 0

OBJECT 0x2210 Digital Counters

Object 0x2210 Stores the values of the 8 counters in 32 bit format.

DIGITAL COUNTERS (OBJECT 0x2210)	
SUBINDEX	DESCRIPTION
1	Counter 1 Value
2	Counter 2 Value
3	Counter 3 Value
4	Counter 4 Value
5	Counter 5 Value
6	Counter 6 Value
7	Counter 7 Value
8	Counter 8 Value

OBJECT 0x2210 Digital Counters

Object 0x2210 Stores the values of the 8 counters in 32 bit format.

DIGITAL COUNTERS (OBJECT 0x2210)	
SUBINDEX	DESCRIPTION
1	Preset Counter 1 Value
2	Preset Counter 2 Value
3	Preset Counter 3 Value
4	Preset Counter 4 Value
5	Preset Counter 5 Value
6	Preset Counter 6 Value
7	Preset Counter 7 Value
8	Preset Counter 8 Value

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LED DESCRIPTION

SERVICE LED DESCRIPTION			
LED		STATE	DESCRIPTION
RUN		BLINKING	Pre-operational mode
		SINGLE FLASH	Stop mode
		ON	Operational mode
ERROR		SINGLE FLASH	At least one error counter has reached or exceeded the warning level
		DOUBLE FLASH	Guard Event
		TRIPLE FLASH	The SYNC hasn't received within the configurated communication cycle time out period
		ON	The Can controller is BUS OFF
		OFF	No error
FAIL		ON/BLINKING	NOT FOUND Vext for Outputs /Data receiving
POWER		ON	Power Supply

INPUT/OUTPUT LED DESCRIPTION			
LED		STATE	DESCRIPTION
1..8		ON	Input [1..8] is high
		OFF	Input [1..8] is low
9..16		ON	Input [9..16] is high
		OFF	Input [9..16] is low
1O..8O		ON	Output [1..8] is high
		OFF	Ouput [1..8] is low

DIP SWITCH CONFIGURATION

DIP-SWITCH SETTINGS
(CANopen PROTOCOL)

KEY
ON

BAUD RATE		ADDRESS	
1 2 3	SOFTWARE PROGRAMMED	4 5 6 7 8 9 10	SOFTWARE PROGRAMMED
	20 kbps	0000001	ADD. 001
	50 kbps	0000010	ADD. 002
	125 kbps	0000011	ADD. 003
	250 kbps	0000100	ADD. 004
	500 kbps	0000101	ADD. 005
	800 kbps	.....	.....
	1 Mbps	1111111	ADD. 127

DIGITAL INPUT MANAGEMENT

OBJECT 0x6003 INPUT FILTER CONFIGURATION

FILTER CONSTANT INPUT (Object 0x6003)	
SUBINDEX	DESCRIPTION
1	FILTER ENABLED FOR INPUT [1..8]
2	FILTER ENABLED FOR INPUT [9..16]

COUNTER MODE ON/OFF

If the value of object 0x6003 subindex 1 is "0" all inputs from 1 to 8 are configured in counter mode (counter mode switched on).

If the value of object 0x6003 subindex 1 is not equal to "0" The counter mode is switched off.

OBJECT 0x6005 INTERRUPT ENABLE

If the value is "1" the station can generate asynchronous TxPDO (DEFAULT).
If the value is "0" the station can't generate asynchronous TxPDO.

OBJECT 0x6007 INTERRUPT MASK LOW TO HIGH

DIGITAL INTERRUPT MASK LOW TO HIGH (OBJECT 0x6007)	
SUBINDEX	DESCRIPTION
1	Interrupt mask on rising edsge input [1..8]
2	Interrupt mask on rising edsge input [9..16]
3	Interrupt mask for counters overflow

For subindex form 1 to 3 if value is "1" than the generation of TxPDO on rising edge is enabled.

If subindex 4 value is "1" the generation of TxPDO on all 8 counters overflows is enabled.

OBJECT 0x6008 INTERRUPT MASK HIGH TO LOW

DIGITAL INTERRUPT MASK LOW TO HIGH (OBJECT 0x6007)	
SUBINDEX	DESCRIPTION
1	Interrupt mask on falling edsge input [1..8]
2	Interrupt mask on falling edsge input [9..16]

For subindex form 1 to 3 if value is "1" than the generation of TxPDO on falling edge is enabled.

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DIGITAL OUTPUT MANAGEMENT

OBJECT 0x6200 8 BIT OUTPUT

8 BIT OUTPUT (Object 0x6200)	
SUBINDEX	DESCRIPTION
1	OUTPUT [1..8] VALUE

OBJECT 0x6206 ERROR MODE OUTPUT

ERROR MODE OUTPUT (Object 0x6206)	
SUBINDEX	DESCRIPTION
1	OUTPUT [1..8] ERROR MODE

In case of communication error:
0 = the output keeps the last value
1 = the output is loaded with object 0x6207

OBJECT 0x6207 ERROR VALUE OUTPUT

ERROR VALUE OUTPUT (Object 0x6207)	
SUBINDEX	DESCRIPTION
1	OUTPUT [1..8] ERROR VALUE

The object stores the outputs values to load in fault case (only if the Error mode output corresponding bit value is "1").

OBJECT 0x6220 SINGLE BIT OUTPUT

ERROR VALUE OUTPUT (Object 0x6207)	
SUBINDEX	DESCRIPTION
1	OUTPUT 1 VALUE
2	OUTPUT 2 VALUE
3	OUTPUT 3 VALUE
4	OUTPUT 4 VALUE
5	OUTPUT 5 VALUE
6	OUTPUT 6 VALUE
7	OUTPUT 7 VALUE
8	OUTPUT 8 VALUE

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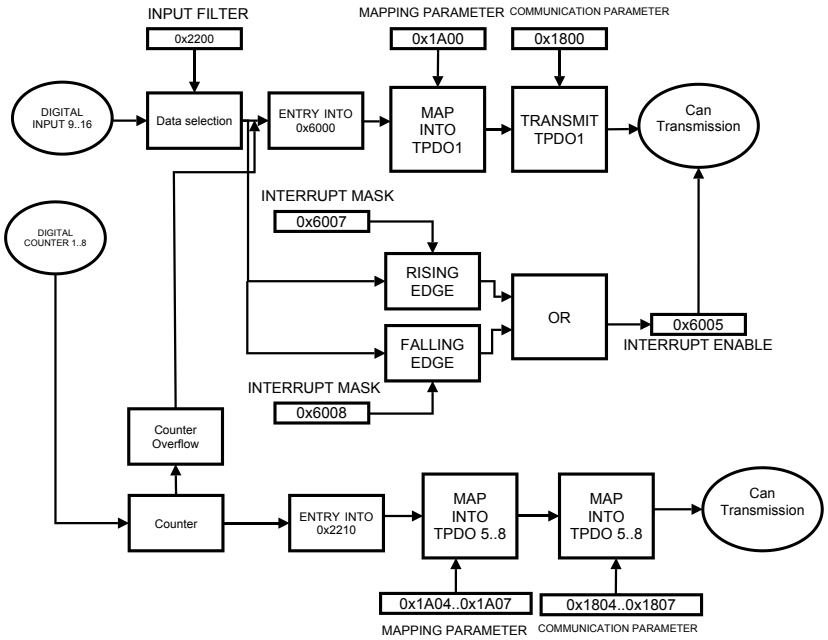
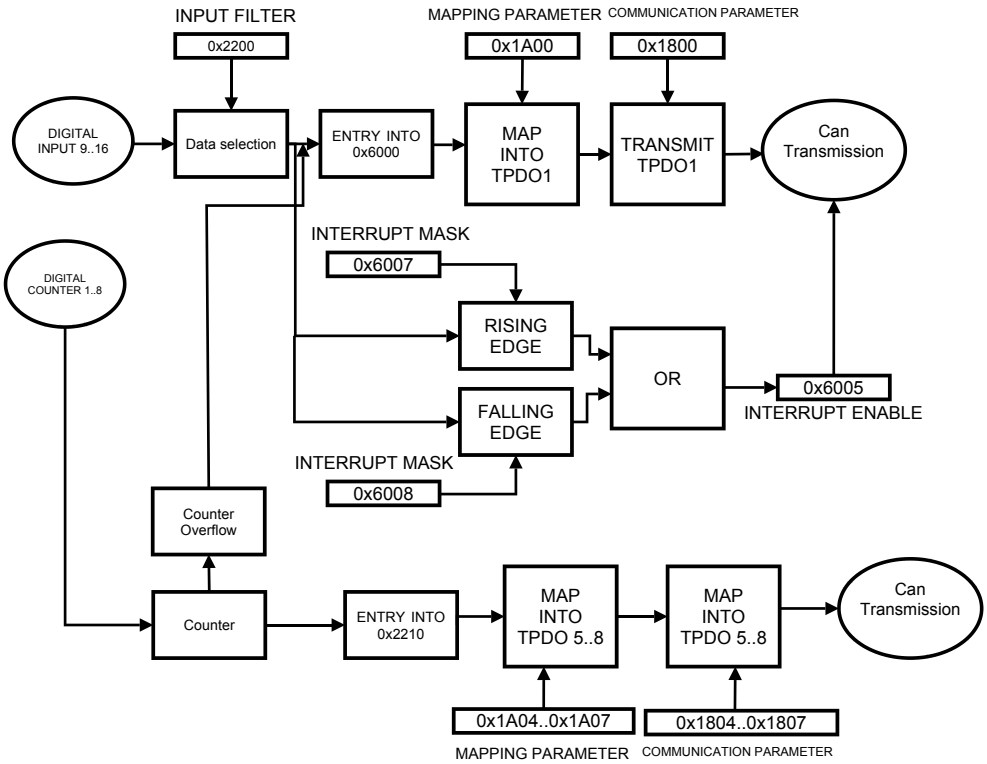
FUNCTIONAL DIAGRAM
COUNTER MODE OFF (DEFAULT)



FUNCTIONAL DIAGRAM
COUNTER MODE ON (Subindex 1 Object 0x6003 = “0”)



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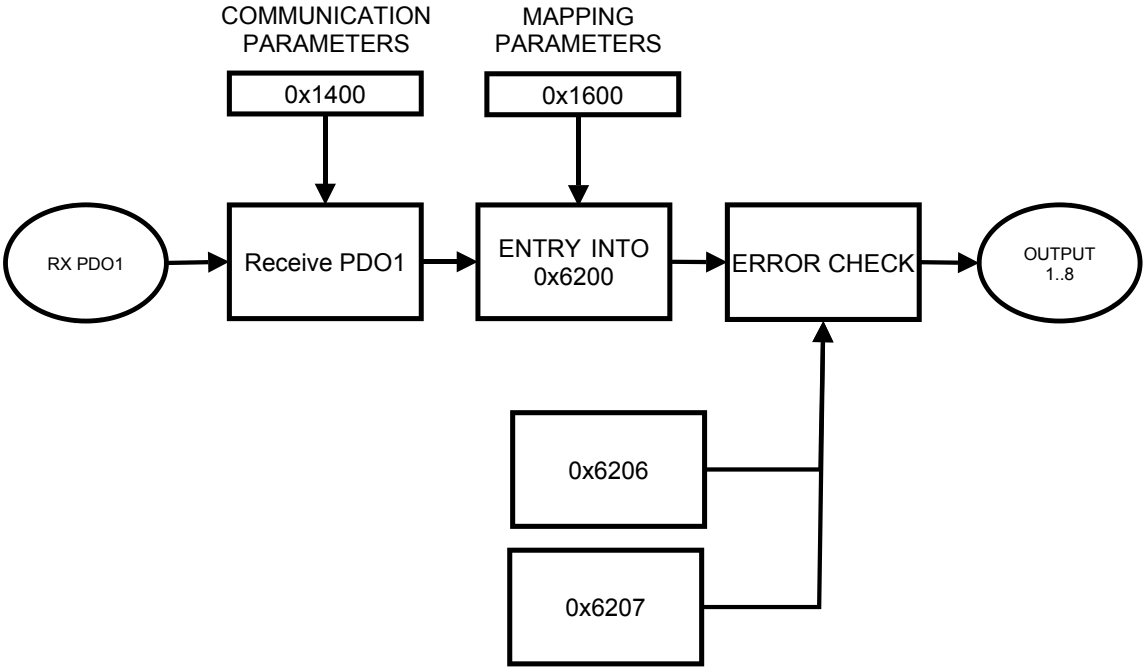
FUNCTIONAL DIAGRAM
DIGITAL OUTPUT



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OBJECT DICTIONARY

COMMUNICATION PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1000	0	Device Type	Device Type (Profile 401 = 0x191)	UNSIGNED 32	RO	0x00030191
0x1001	0	Error register	Error register (DS 401)	UNSIGNED 8	RO	0
0x1002	0	Manufacturer Status Register	Status Register	UNSIGNED 32	RO	0
0x1005	0	SYNC COB-ID	The device consumes the SYNC message	UNSIGNED 32	RW	0x80
0x1006	0	Communication Window Length	Sync interval [us]	UNSIGNED 32	RW	0
0x1007	0	Synchronous Window Length	Time window [us] for the PDO transmission after the SYNC	UNSIGNED 32	RW	0
0x1008	0	Manufacturer Device name	Device name	VISIBLE STRING	RO	"ZC-16DI8DO"
0x1009	0	Manufacturer Hardware Version	Hardware version	VISIBLE STRING	RO	“SC000000”
0x100A	0	Manufacturer Software Version	Software version	VISIBLE STRING	RO	"SW001190"
0x100C	0	Guard Time	Guard Time [ms]	UNSIGNED 16	RW	0
0x100D	0	Life Time Factor	Max delay between two guarding telegrams = Guard_Time*Life_Time_Factor	UNSIGNED 8	RW	0
0x1010	0	Store Parameters	Max Subindex Number		RO	4
	1	Save All Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	2	Save Communication Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	3	Save Application Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	4	Save Manufacturer Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
0x1011	0	Restore Default	Max Subindex Number	UNSIGNED 8	RO	4
	1	Restore All Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	2	Restore Communication Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	3	Restore Application Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB))	UNSIGNED 32	RW	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
	4	Restore Manufactures Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
0x1014	0	COB-ID Emergency Object	COB-ID for Emergency Object	UNSIGNED 32	RO	NODEID+0x80
0x1018	0	Identity Object	Max Subindex Number	UNSIGNED 8	RO	4
	1	Vendor ID	Seneca srl	UNSIGNED 32	RO	0x00000249
	2	Product Code	ZC-16DI8DO Machine ID Code	UNSIGNED 32	RO	0x00000022
	3	Revision Number	Revision	UNSIGNED 32	RO	0
	4	Serial Number	Serial Number Code	UNSIGNED 32	RO	0
0x1200	0	Server SDO Parameters	Max Subindex Number	UNSIGNED 8	RO	2
	1	Receive SDO COB-ID	COB-ID of Receive SDO	UNSIGNED 32	RO	NODEID + 0x600
	2	Transmit SDO COB-ID	COB-ID of Transmit SDO	UNSIGNED 32	RO	NODEID + 0x580
0x1400	0	Receive PDO1 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO1	UNSIGNED 32	RW	NODEID + 0x200
	2	Transmission Type	Transmission Type for RxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Not used in Rx PDO	UNSIGNED 16	RW	0x0000
0x1600	0	Receive PDO1 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	1
	1	Object NR1	First Object (default:Output 1..8)	UNSIGNED 32	RW	0x62000108 Object = 0x6200 subindex = 1 Length = 8 bit
0x1800	0	Transmit PDO1 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO1	UNSIGNED 32	RW	NODEID + 0x40000180
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1804	0	Transmit PDO5 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO5	UNSIGNED 32	RW	NODEID + 0x40000280
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0x01
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1805	0	Transmit PDO6 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO6	UNSIGNED 32	RW	NODEID + 0x40000380
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0x01
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1806	0	Transmit PDO7 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO7	UNSIGNED 32	RW	NODEID + 0x40000480
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0x01
	3	Inhibit Time	Min. delay for transmit the next TxPDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1807	0	Transmit PDO8 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO8	UNSIGNED 32	RW	NODEID + 0x40000300
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0x01
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1A00	0	Transmit PDO1 Mapping	Max Subindex Number	UNSIGNED 8	RO	3
	1	Object NR1	First Object (default: Input 1..8)	UNSIGNED 32	RW	0x60000108 Object = 0x6000 subindex = 1 Length = 8 bit
	2	Object NR2	Second Object (default: Input 9..16)	UNSIGNED 32	RW	0x60000208 Object = 0x6000 subindex = 2 Length = 8 bit
	3	Object NR3	Fourth Object (default: Counter 1..8 Overflow)	UNSIGNED 32	RW	0x60000308 Object = 0x6000 subindex = 3 Length = 8 bit
0x1A04	0	Transmit PDO5 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default: Counter 1)	UNSIGNED 32	RW	0x22100120 Object = 0x2210 subindex = 1 Length = 32 bit
	2	Object NR2	Second Object (default: Counter 2)	UNSIGNED 32	RW	0x22100220 Object = 0x2210 subindex = 2 Length = 32 bit

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1A05	0	Transmit PDO6 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default: Counter 3)	UNSIGNED 32	RW	0x22100320 Object = 0x2210 subindex = 3 Length = 32 bit
	2	Object NR2	Second Object (default: Counter 4)	UNSIGNED 32	RW	0x22100420 Object = 0x2210 subindex = 4 Length = 32 bit
0x1A06	0	Transmit PDO7 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default: Counter 5)	UNSIGNED 32	RW	0x22100520 Object = 0x2210 subindex = 5 Length = 32 bit
	2	Object NR2	Second Object (default: Counter 6)	UNSIGNED 32	RW	0x22100620 Object = 0x2210 subindex = 6 Length = 32 bit
0x1A07	0	Transmit PDO8 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default: Counter 7)	UNSIGNED 32	RW	0x22100720 Object = 0x2210 subindex = 7 Length = 32 bit
	2	Object NR2	Second Object (default: Counter 8)	UNSIGNED 32	RW	0x22100820 Object = 0x2210 subindex = 8 Length = 32 bit

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MANUFACTURER SPECIFIC PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2001	0	Module Address	Station Address (only if dip switch 4,5,6,7,8,9,10 are OFF)	UNSIGNED 8	RW	127
0x2002	0	Buad Rate	Station Baud Rate (only if dip switch 1,2,3 are OFF) 1 = 20Kbps 2 = 50Kbps 3 = 125Kbps 4 = 250Kbps 5 = 500Kbps 6 = 800Kbps 7 = 1Mbps	UNSIGNED 8	RW	7
0x2030	0	Device Temperature	Max Subindex Number	UNSIGNED 8	RO	4
	1	Internal Temperatue	Station internal Temperature [°C/10]	INTEGER 16	RO	0
	2	Hi Hi Temperature	Critical Hot Temperature (All operations Stop)[°C/10]	INTEGER 16	RO	950
	3	Hi Temperature	Warning for Too Hot Temperature [°C/10]	INTEGER 16	RO	900
	4	Lo Temperature	Critical Low Temperature (All operations Stop)[°C/10]	INTEGER 16	RO	-250
0x2051	0	CPU Command	Command to execute Supported commands are: 0x5C0n Force preset for counter n 0x5D0n Force counter n reset 0x5E0n Force overflow for counter n	UNSIGNED 16	RW	0
0x2052	0	Aux Command	Reserved	UNSIGNED 16	RW	0
0x2200	0	Input Filter Parameter	Max Subindex Number	UNSIGNED 8	RO	3
	1	Filter Length	Number of samples to evaluate	UNSIGNED 8	RW	40
	2	Counter threshold for high level	If counter >= threshold_high input is stated “high”	UNSIGNED 8	RW	20
	3	Counter threshold for high level	If counter <= threshold_low input is stated “low”	UNSIGNED 8	RW	20

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2210	0	Input Counters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Counter 1 Value	Counter 1 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	2	Counter 2 Value	Counter 2 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	3	Counter 3 Value	Counter 3 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	4	Counter 4 Value	Counter 4 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	5	Counter 5 Value	Counter 5 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	6	Counter 6 Value	Counter 6 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	7	Counter 7 Value	Counter 7 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
	8	Counter 8 Value	Counter 8 value (Only if Filter for inputs 1..8 is disabled)	UNSIGNED 32	RO	0
0x2211	0	Preset for Input Counters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Counter 1 Preset Value	Counter 1 preset value	UNSIGNED 32	RW	0
	2	Counter 2 Preset Value	Counter 2 preset value	UNSIGNED 32	RW	0
	3	Counter 3 Preset Value	Counter 3 preset value	UNSIGNED 32	RW	0
	4	Counter 4 Preset Value	Counter 4 preset value	UNSIGNED 32	RW	0
	5	Counter 5 Preset Value	Counter 5 preset value	UNSIGNED 32	RW	0
	6	Counter 6 Preset Value	Counter 6 preset value	UNSIGNED 32	RW	0
	7	Counter 7 Preset Value	Counter 7 preset value	UNSIGNED 32	RW	0
	8	Counter 8 Preset Value	Counter 8 preset value	UNSIGNED 32	RW	0
0x2520	0	Output 1..8 Status	Max Subindex Number	UNSIGNED 8	RO	1
	1	Output Status	1 = Output status ERROR 0 = Output status OK	UNSIGNED 8	RO	0
0x2521	0	Output 1..8 Fail type	Max Subindex Number	UNSIGNED 8	RO	1
	1	Fail Type	Reserved	UNSIGNED 8	RW	0

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STANDARD DEVICE PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6000	0	8 bit Digital Input / Counter 1 overflow	Max Subindex Number	UNSIGNED 8	RO	3
	1	Input [1..8] Value	Read input [1..8] value	UNSIGNED 8	RO	0
	2	Input [9..16] Value	Read input [9..16] value	UNSIGNED 8	RO	0
	3	Counter [1..8] Overflow	Overflow Status Counter [1..8]	UNSIGNED 8	RO	0
0x6003	0	Filter Mask enable	Max Subindex Number	UNSIGNED 8	RO	2
	1	Input [1..8] Filter Mask Enable	Input [1..8] Filter enable Mask bit 0 = Filter disabled Mask bit 1 = Filter enabled	UNSIGNED 8	RW	0xFF
	2	Input [9..16] Filter Mask Enable	Input [9..16] Filter enable Mask bit 0 = Filter disabled Mask bit 1 = Filter enabled	UNSIGNED 8	RW	0xFF
0x6005	0	Global Interrupt Enabled	0 = TxPDO Asynchronous disabled 1 = TxPDO Asynchronous enabled	UNSIGNED 8	RW	1
0x6007	0	Interrupt Mask Low to High	Max Subindex Number	UNSIGNED 8	RO	3
	1	Input [1..8] interrupt Low to High mask enable	Input [1..8] rising interrupt mask enable Mask bit 0 = rising interrupt disabled Mask bit 1 = rising interrupt enabled	UNSIGNED 8	RW	0xFF
	2	Input [9..16] interrupt Low to High mask enable	Input [9..16] rising interrupt enable Mask bit 0 = rising interrupt disabled Mask bit 1 = rising interrupt enabled	UNSIGNED 8	RW	0xFF
	3	Counter [1..8] Overflow interrupt mask enable	Counter [1..8] uprising interrupt mask enable Mask bit 0 = rising interrupt disabled Mask bit 1 = rising interrupt enabled	UNSIGNED 8	RW	0xFF
0x6008	0	Interrupt Mask High to Low	Max Subindex Number	UNSIGNED 8	RO	2
	1	Input [1..8] interrupt High to Low mask enable	Input [1..8] falling interrupt mask enable Mask bit 0 = falling interrupt disabled Mask bit 1 = falling interrupt enabled	UNSIGNED 8	RW	0xFF
	2	Input [9..16] interrupt High to Low mask enable	Input [9..16] falling interrupt enable Mask bit 0 = falling interrupt disabled Mask bit 1 = falling interrupt enabled	UNSIGNED 8	RW	0xFF

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6020	0	Read Input 1 Bit	Max Subindex Number	UNSIGNED 8	RO	16
	1	Input 1 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	2	Input 2 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	3	Input 3 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	4	Input 4 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	5	Input 5 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	6	Input 6 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	7	Input 7 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	8	Input 8 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	9	Input 9 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	10	Input 10 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	11	Input 11 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	12	Input 12 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	13	Input 13 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	14	Input 14 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	15	Input 15 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
	16	Input 16 Value	0 = Input is “Low” 1 = Input is “High”	BOOLEAN	RO	0
0x6200	0	8 bit Output	Max Subindex Number	UNSIGNED 8	RO	1
	1	Output 1..8 Value	Output value	UNSIGNED 8	RW	0
0x6206	0	Error Mode Output	Max Subindex Number	UNSIGNED 8	RO	1
	1	Error Mode Output [1..8]	“1” = Load 0x6207 value “0” = Keep last	UNSIGNED 8	RW	0xFF
0x6207	0	Error Value Output	Max Subindex Number	UNSIGNED 8	RO	1
	1	Error value Output [1..8]	Value to Load in fail case	UNSIGNED 8	RW	0x00
0x6220	0	Single Bit Output	Max Subindex Number	UNSIGNED 8	RO	8
	1	Output 1 Value	Output 1	BOOLEAN	RW	0
	2	Output 2 Value	Output 2	BOOLEAN	RW	0
	3	Output 3 Value	Output 3	BOOLEAN	RW	0
	4	Output 4 Value	Output 4	BOOLEAN	RW	0
	5	Output 5 Value	Output 5	BOOLEAN	RW	0
	6	Output 6 Value	Output 6	BOOLEAN	RW	0
	7	Output 7 Value	Output 7	BOOLEAN	RW	0
	8	Output 8 Value	Output 8	BOOLEAN	RW	0

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EN

ZC - 8AI

CANopen I/O Module
8 Voltage/Current
Input converter

User Manual

Contents:

Features
PDOs
Emergency Message
Manufacturer Specific Objects
Objects for Analog Data
Led Description
Dip Switch Configuration
Interrupt Objects
Functional Diagrams
Object Dictionary

PDOs MAPPING

OBJECTS FOR DEFAULT MAPPING				
PDO NR	COB-ID	MAPPED OBJECT	INDEX	SUBINDEX
TPDO 2	0x40000280 + NodeId	Value CH1 16 bit	0x6401	1
		Value CH2 16 bit	0x6401	2
		Value CH3 16 bit	0x6401	3
		Value CH4 16 bit	0x6401	4
TPDO 3	0x40000380 + NodeId	Value CH5 16 bit	0x6401	5
		Value CH6 16 bit	0x6401	6
		Value CH7 16 bit	0x6401	7
		Value CH8 16 bit	0x6401	8

Note that a TPDO COB-ID must start with 0x4

FEATURES

TECHNICAL DATA	
Baud rate	20, 50, 125, 250, 500, 800, 1000 Kbits/s
Typical Conversion Time	20ms for 4 Channels/ 40ms for 8 Channels
Input supported	Voltage from 0 to 10,5 V Current from 0 to 20,5 mA
CANopen TECHNICAL DATA	
NMT	SLAVE
ERROR CONTROL	NODE GUARDING
NODE ID	HW SWITCH OR SOFTWARE
NUMBER OF PDO	4 TX
PDO MODES	Event Triggered, Sync (cyclic), Sync (acyclic)
PDO MAPPING	VARIABLE
PDO LINKING	SUPPORTED
NUMBER OF SDO	1 SERVER
ERROR MESSAGE	YES
SUPPORTED APPLICATION LAYER	CiA 301 v4.02
SUPPORTED PROFILE	CiA 401 v2.01

EMERGENCY MESSAGE

The Emergency message is composed by:
2 bytes of EEC (Emergency Error Code)
1 byte of ER (Error register)
A Maximum of 4 bytes of MEF (Manufacturer Error Filed Object 0x1002)

EEC (Emergency Error Code)	
CODE	DESCRIPTION
0x0000	No Error
0x1000	Generic error
0x4201	CPU Temperature over HOT STOP ERROR
0x4202	CPU Temperature over HOT STOP
0x4203	CPU Temperature under COLD ERROR
0x8110	Can Communication Overrun
0x8120	Error Passive
0x8130	Life Guard Error
0x8140	Recovered From Bus Off
0xFF10	General Input Channels Error
0xFF11	Command for Input Channels Error
0xFF20	CPU Error

ER (Error Register)							
BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT1	BIT 0
Generic		Voltage	Temperature	Communication			Manifacture

Where if a bit is 0 means no error

TPDO TRANSMISSIONS TYPE SUPPORTED

OBJECT VALUE 0x180x sub 2	TRANSMISSION TYPE
0	Synchronous - acyclic
From 1 to 240	Synchronous - cyclic
255	Asynchronous

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For EEC code 0xFF10 the EMERGENCY MESSAGE is:

EMERGENCY MESSAGE				
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4
0xFF10		0x81	**MEF**	

With this MEF:

MEF (Manufacturer-specific Error Field) for EEC 0xFF10		
BIT	DESCRIPTION	OBJECT FOR ERROR DETAILS
15	CHANNEL 1 / 2 FAIL	0x2120 Subindex 1
14	CHANNEL 3 / 4 FAIL	0x2120 Subindex 2
13	CHANNEL 5 / 6 FAIL	0x2120 Subindex 3
12	CHANNEL 7 / 8 FAIL	0x2120 Subindex 4
11	CHANNEL 1 FAIL	0x2120 Subindex 1
10	CHANNEL 2 FAIL	0x2120 Subindex 1
9	CHANNEL 3 FAIL	0x2120 Subindex 2
8	CHANNEL 4 FAIL	0x2120 Subindex 2
7	CHANNEL 5 FAIL	0x2120 Subindex 3
6	CHANNEL 6 FAIL	0x2120 Subindex 3
5	CHANNEL 7 FAIL	0x2120 Subindex 4
4	CHANNEL 8 FAIL	0x2120 Subindex 4
3	CHANNEL 1 / 2 COMMUNICATION FAIL	0x2121 Subindex 1
2	CHANNEL 3 / 4 COMMUNICATION FAIL	0x2121 Subindex 2
1	CHANNEL 5 / 6 COMMUNICATION FAIL	0x2121 Subindex 3
0	CHANNEL 7 / 8 COMMUNICATION FAIL	0x2121 Subindex 4

For "Voltage Error" the Emergency Message will be:

EMERGENCY MESSAGE				
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4
0xFF10		0x85	**OBJECT 0x2100**	

For "Timeout command" or "Error Command" the Emergency Message will be:

EMERGENCY MESSAGE					
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	BYTE 5
0xFF11		0x81	**CHANNEL ID**	**Object 0x2103 Subindex CHANNELID**	

Where the meaning of CHANNEL ID is:

CHANNEL ID	
CHANNEL ID	DESCRIPTION
0x01	CHANNEL 1 / 2
0x02	CHANNEL 3 / 4
0x03	CHANNEL 5 / 6
0x04	CHANNEL 7 / 8

For "CPU ERROR" the Emergency Message will be:

EMERGENCY MESSAGE						
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	**BYTE 5**	BYTE 6
0xFF20		0X81	**Object 0x1002**			

OBJECT 0x1002: MANUFACTURER STATUS REGISTER

Object 0x1002 is the CPU and inputs status.

OBJECT 0x1002 : MANUFACTURER STATUS REGISTER	
BIT	DESCRIPTION
31..18	NA
17	CHANNEL 8 Saturation Error
16	CHANNEL 7 Saturation Error
15	CHANNEL 6 Saturation Error
14	CHANNEL 5 Saturation Error
13	CHANNEL 4 Saturation Error
12	CHANNEL 3 Saturation Error
11	CHANNEL 2 Saturation Error
10	CHANNEL 1 Saturation Error
9	Good Data Value
8	Precision Data Value
7..1	NA
0	CPU EEPROM CRC ERROR

OBJECT 0x1006: COMMUNICATION WINDOW LENGTH

OBJECT 0x1006 : COMMUNICATION WINDOW LENGTH	
MIN VAL [ms]	MAX VAL [ms]
10	10000

OBJECT 0x1007: SYNCHRONOUS WINDOW LENGTH

OBJECT 0x1007 : SYNCHRONOUS WINDOW LENGTH	
MIN VAL [ms]	MAX VAL [ms]
2	2000

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MANUFACTURE SPECIFIC PROFILE AREA

OBJECT 0x2001 NODE ADDRESS

If Hardware switches are in "from memory" mode the node address is selectable by object 0x2001.

NODE ADDRESS (Object 0x2001)	
OBJECT VALUE	DESCRIPTION
0..127	Node Address

OBJECT 0x2002 BAUD RATE

If Hardware switches are in "from memory" mode the baud rate is selectable by object 0x2002.

BAUD RATE (Object 0x2002)	
OBJECT VALUE	DESCRIPTION
1	20 Kbit/s
2	50 Kbit/s
3	125 Kbit/s
4	250 Kbit/s
5	500 Kbit/s
6	800 Kbit/s
7	1 Mbit/s

OBJECT 0x2030 CPU TEMPERATURE

Object can be used for monitoring the CPU temperature. The HOT STOP Temperature sends in pre-operational the station.

The HOT ERROR and the COLD ERROR Temperature sends the Emergency Object.

The Object is Read Only.

CPU TEMPERATURE (Object 0x2030)	
SUBINDEX	DESCRIPTION
1	Actual Temperature [°C/10]
2	Temperature for HOT STOP ERROR [°C/10] 95.0°C
3	Temperature for HOT ERROR [°C/10] 90.0°C
4	Temperature for COLD ERROR [°C/10] -25.0°C

OBJECT 0x2100: CHANNELS STATUS

Object 0x2100 contains the channels status:

CHANNELS STATUS (OBJECT 0x2100)		
BIT	DESCRIPTION	OBJECT FOR ERROR DETAILS
15	CHANNEL 1 / 2 FAIL	0x2120 Subindex 1
14	CHANNEL 3 / 4 FAIL	0x2120 Subindex 2
13	CHANNEL 5 / 6 FAIL	0x2120 Subindex 3
12	CHANNEL 7 / 8 FAIL	0x2120 Subindex 4
11	CHANNEL 1 FAIL	0x2120 Subindex 1
10	CHANNEL 2 FAIL	0x2120 Subindex 1
9	CHANNEL 3 FAIL	0x2120 Subindex 2
8	CHANNEL 4 FAIL	0x2120 Subindex 2
7	CHANNEL 5 FAIL	0x2120 Subindex 3
6	CHANNEL 6 FAIL	0x2120 Subindex 3
5	CHANNEL 7 FAIL	0x2120 Subindex 4
4	CHANNEL 8 FAIL	0x2120 Subindex 4
3	CHANNEL 1 / 2 COMMUNICATION FAIL	0x2121 Subindex 1
2	CHANNEL 3 / 4 COMMUNICATION FAIL	0x2121 Subindex 2
1	CHANNEL 5 / 6 COMMUNICATION FAIL	0x2121 Subindex 3
0	CHANNEL 7 / 8 COMMUNICATION FAIL	0x2121 Subindex 4

OBJECT 0x2106 - 0x2107- 0x2108 - 0x2109 CHANNELS CONFIGURATION

Objects from 0x2106 to 0x2109 contains the channels configuration:

CHANNELS CONFIGURATION	
OBJECT	DESCRIPTION
0x2106	CHANNEL 1/2 CONFIGURATION
0x2107	CHANNEL 3/4 CONFIGURATION
0x2108	CHANNEL 5/6 CONFIGURATION
0x2109	CHANNEL 7/8 CONFIGURATION

SUBINDEX CHANNELS CONFIGURATION	
SUBINDEX	DESCRIPTION
1	CHANNEL A ENABLE (1 = enable 0 = disable)
2	CHANNEL B ENABLE (1 = enable 0 = disable)
3	INPUT TYPE (1 = Corrent 0 = Voltage)
4	FREQUENCY REJECTION (1 = 60Hz 0 = 50 Hz)
5	FILTER

FILTER VALUES	
VALUE	**FILTER TYPE**
0	DISABLED
1	AVERAGE FILTER
2	HIRES + AVERAGE FILTER
3	HIRES + AVERAGE + EXPONENTIAL (LEVEL 1) FILTER
..	..
7	HIRES + AVERAGE + EXPONENTIAL (LEVEL 5) FILTER

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INTEGER SCALE PROCESS

Integer input objects can be scaled by a BEGIN (referred to 0 mV or 0 uA) for a 0 integer value and an END (referred to 10000 mV or 20000 uA) for a 10000 integer value.
The formula is:

Int16 = ((VAL-BGN)/(END-BGN))*10000

OBJECT 0x2700: BEGIN FOR INTEGER SCALE

The Object sets the customization of the associated mV or uA input value to the 0 integer value.

BEGIN FOR INTEGER SCALE (Object 0x2700)	
SUBINDEX	DESCRIPTION
1	BEGIN VALUE FOR CHANNEL 1 [mv] or [uA]
2	BEGIN VALUE FOR CHANNEL 2 [mv] or [uA]
3	BEGIN VALUE FOR CHANNEL 3 [mv] or [uA]
4	BEGIN VALUE FOR CHANNEL 4 [mv] or [uA]
5	BEGIN VALUE FOR CHANNEL 5 [mv] or [uA]
6	BEGIN VALUE FOR CHANNEL 6 [mv] or [uA]
7	BEGIN VALUE FOR CHANNEL 7 [mv] or [uA]
8	BEGIN VALUE FOR CHANNEL 8 [mv] or [uA]

OBJECT 0x2701: END FOR INTEGER SCALE

The Object sets the customization of the associated mV or uA input value to the 10000 integer value.

END FOR INTEGER SCALE (Object 0x2700)	
SUBINDEX	DESCRIPTION
1	END VALUE FOR CHANNEL 1 [mv] or [uA]
2	END VALUE FOR CHANNEL 2 [mv] or [uA]
3	END VALUE FOR CHANNEL 3 [mv] or [uA]
4	END VALUE FOR CHANNEL 4 [mv] or [uA]
5	END VALUE FOR CHANNEL 5 [mv] or [uA]
6	END VALUE FOR CHANNEL 6 [mv] or [uA]
7	END VALUE FOR CHANNEL 7 [mv] or [uA]
8	END VALUE FOR CHANNEL 8 [mv] or [uA]

LED DESCRIPTION

SERVICE LED DESCRIPTION		
LED	STATE	DESCRIPTION
RUN	BLINKING	Pre-operational mode
	SINGLE FLASH	Stop mode
	ON	Operational mode
ERROR	SINGLE FLASH	At least one error counter has reached or exceeded the warning level
	DOUBLE FLASH	Guard Event
	TRIPLE FLASH	The SYNC hasn't received within the configurated communication cycle time out period
	ON	The Can controller is BUS OFF
	OFF	No error
FAIL	BLINKING	Data receiving from front jack
	ON	At least one channel is in error mode
POWER	ON	Power Supply

DIP SWITCH CONFIGURATION

DIP-SWITCH SETTINGS (CANopen PROTOCOL)

KEY
ON

BAUD RATE (1 2 3)		ADDRESS (4 5 6 7 8 9 10)	
SOFTWARE PROGRAMMED		0000000	SOFTWARE PROGRAMMED
20 kbps		0000001	ADD. 001
50 kbps		0000010	ADD. 002
125 kbps		0000011	ADD. 003
250 kbps		0000100	ADD. 004
500 kbps		0000101	ADD. 005
800 kbps		.....	.....
1 Mbps		1111111	ADD. 127

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OBJECTS FOR ANALOG DATA

OBJECT 0x6401 16 BIT INPUT VALUE

Object 0x6401 contains the 16 bit (signed) values for channels 1..8 scaled by scaled objects and in agreement with object 0x2106).

16 BIT INTEGER INPUT (OBJECT 0x6401)	
SUBINDEX	DESCRIPTION
1	Channel 1 16bit Input value
2	Channel 2 16bit Input value
3	Channel 3 16bit Input value
4	Channel 4 16bit Input value
5	Channel 5 16bit Input value
6	Channel 6 16bit Input value
7	Channel 7 16bit Input value
8	Channel 8 16bit Input value

OBJECT 0x6403 32 BIT INPUT VALUE

Object 0x6403 contanins the floating point (32 bit) values for channels 1..8 in [mV] or [uA] (in agreement with object 0x2106).

32 BIT REAL INTEGER INPUT (OBJECT 0x6403)	
SUBINDEX	DESCRIPTION
1	Channel 1 float Input value
2	Channel 2 float Input value
3	Channel 3 float Input value
4	Channel 4 float Input value
5	Channel 5 float Input value
6	Channel 6 float Input value
7	Channel 7 float Input value
8	Channel 8 float Input value

OBJECT 0x6423 INTERRUPT ENABLE

If the value is “1” the station can generate asynchronous TxPDO.
If the value is “0” the station can’t generate asynchronous TxPDO.

OBJECT 0x6430 SI Unit

Object 0x6430 assign the measure unit for the analogic input measure. Subindex 1 is referred to input 1 ... Subindex 8 is referred to input 8.

SI UNIT (OBJECT 0x6401)	
MEASURE UNIT	VALUE
mV	0xFD260000
uA	0xFA040000

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OBJECT 0x6424 INTERRUPT UPPER LIMIT INTEGER

If enabled (see 0x6423 object), an interrupt is triggered when the analogue input is equal or rises above the given value. As long as the trigger condition is met, every change of the analogue input data generates a new interrupt if interrupt delta (Object 0x6426) is't also true.

INTERRUPT UPPER LIMIT 16 BIT INTEGER (OBJECT 0x6424)	
SUBINDEX	DESCRIPTION
1	Channel 1 upper limit integer [mV] or [uA]
2	Channel 2 upper limit integer [mV] or [uA]
3	Channel 3 upper limit integer [mV] or [uA]
4	Channel 4 upper limit integer [mV] or [uA]
5	Channel 5 upper limit integer [mV] or [uA]
6	Channel 6 upper limit integer [mV] or [uA]
7	Channel 7 upper limit integer [mV] or [uA]
8	Channel 8 upper limit integer [mV] or [uA]

OBJECT 0x6429 INTERRUPT UPPER LIMIT FLOAT (32 BIT)

This object sets the converted upper limits for interrupt-enabled analogue inputs (see 0x6423 object). As long as the trigger condition is met, every change of the analogue input data generates a new interrupt if interrupt delta (Object 0x642B) is't also true.

INTERRUPT UPPER LIMIT 32 BIT FLOAT (OBJECT 0x6429)	
SUBINDEX	DESCRIPTION
1	Channel 1 upper limit float [mV] or [uA]
2	Channel 2 upper limit float [mV] or [uA]
3	Channel 3 upper limit float [mV] or [uA]
4	Channel 4 upper limit float [mV] or [uA]
5	Channel 5 upper limit float [mV] or [uA]
6	Channel 6 upper limit float [mV] or [uA]
7	Channel 7 upper limit float [mV] or [uA]
8	Channel 8 upper limit float [mV] or [uA]

OBJECT 0x6425 INTERRUPT LOWER LIMIT INTEGER

If enabled (see 0x6423 object), an interrupt is triggered when the analogue input falls below the given value. As long as the trigger condition is met, every change of the analogue input data generates a new interrupt if interrupt delta (Object 0x6426) is't also true.

INTERRUPT LOWER LIMIT 16 BIT INTEGER (OBJECT 0x6425)	
SUBINDEX	DESCRIPTION
1	Channel 1 lower limit integer [mV] or [uA]
2	Channel 2 lower limit integer [mV] or [uA]
3	Channel 3 lower limit integer [mV] or [uA]
4	Channel 4 lower limit integer [mV] or [uA]
5	Channel 5 lower limit integer [mV] or [uA]
6	Channel 6 lower limit integer [mV] or [uA]
7	Channel 7 lower limit integer [mV] or [uA]
8	Channel 8 lower limit integer [mV] or [uA]

OBJECT 0x642A INTERRUPT LOWER LIMIT FLOAT (32BIT)

This object sets the lower limits for interrupt-enabled analogue inputs (see 0x6423 object). As long as the trigger condition is met, every change of the analogue input data generates a new interrupt if interrupt delta (Object 0x642B) is't also true.

INTERRUPT LOWER LIMIT 16 BIT INTEGER (OBJECT 0x6425)	
SUBINDEX	DESCRIPTION
1	Channel 1 lower limit float [mV] or [uA]
2	Channel 2 lower limit float [mV] or [uA]
3	Channel 3 lower limit float [mV] or [uA]
4	Channel 4 lower limit float [mV] or [uA]
5	Channel 5 lower limit float [mV] or [uA]
6	Channel 6 lower limit float [mV] or [uA]
7	Channel 7 lower limit float [mV] or [uA]
8	Channel 8 lower limit float [mV] or [uA]

OBJECT 0x6426 INTERRUPT DELTA UNSIGNED

This object sets the delta value (rising or falling above or below the last communicated value) for interrupt-enabled analogue inputs (if Object 0x6423 enables the interrupt).

INTERRUPT DELTA UNSIGNED INTEGER 16 BIT (OBJECT 0x6426)	
SUBINDEX	DESCRIPTION
1	Channel 1 delta unsigned [mV] or [uA]
2	Channel 2 delta unsigned [mV] or [uA]
3	Channel 3 delta unsigned [mV] or [uA]
4	Channel 4 delta unsigned [mV] or [uA]
5	Channel 5 delta unsigned [mV] or [uA]
6	Channel 6 delta unsigned [mV] or [uA]
7	Channel 7 delta unsigned [mV] or [uA]
8	Channel 8 delta unsigned [mV] or [uA]

OBJECT 0x642B INTERRUPT DELTA FLOAT (32 BIT)

This object sets the delta value (rising or falling above or below the last sample) in Float format for interrupt-enabled analogue inputs (if Object 0x6423 enables the interrupt).

INTERRUPT DELTA FLOAT 32 BIT (OBJECT 0x642B)	
SUBINDEX	DESCRIPTION
1	Channel 1 delta float [mV] or [uA]
2	Channel 2 delta float [mV] or [uA]
3	Channel 3 delta float [mV] or [uA]
4	Channel 4 delta float [mV] or [uA]
5	Channel 5 delta float [mV] or [uA]
6	Channel 6 delta float [mV] or [uA]
7	Channel 7 delta float [mV] or [uA]
8	Channel 8 delta float [mV] or [uA]

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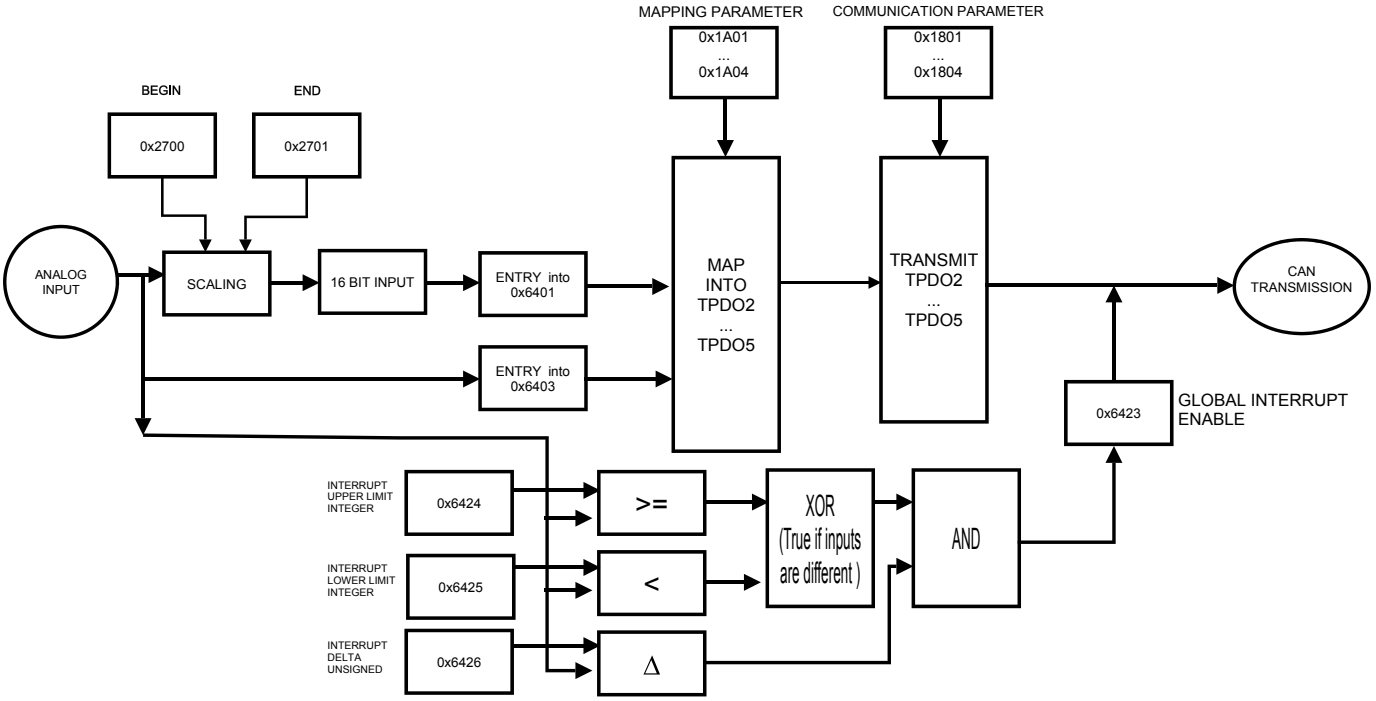
FUNCTIONAL DIAGRAM



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OBJECT DICTIONARY

COMMUNICATION PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1000	0	Device Type	Device Type (Profile 401 = 0x191)	UNSIGNED 32	RO	0x00040191
0x1001	0	Error register	Error register (DS 401)	UNSIGNED 8	RO	0
0x1002	0	Manufacturer Status Register	Status Register	UNSIGNED 32	RO	0
0x1005	0	SYNC COB-ID	The device consumes the SYNC message	UNSIGNED 32	RW	0x80
0x1006	0	Communication Window Length	Sync interval [us]	UNSIGNED 32	RW	0
0x1007	0	Synchronous Window Length	Time window [us] for the PDO transmission after the SYNC	UNSIGNED 32	RW	0
0x1008	0	Manufacturer Device name	Device name	VISIBLE STRING	RO	“ZC-8AI”
0x1009	0	Manufacturer Hardware Version	Hardware version	VISIBLE STRING	RO	“SC000000”
0x100A	0	Manufacturer Software Version	Software version	VISIBLE STRING	RO	“SW001140”
0x100C	0	Guard Time	Guard Time [ms]	UNSIGNED 16	RW	0
0x100D	0	Life Time Factor	Max delay between two guarding telegrams = Guard_Time*Life_Time_Factor	UNSIGNED 8	RW	0
0x1010	0	Store Parameters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Save All Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	2	Save Communication Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	3	Save Application Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	4	Save Manufacturer Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	5	Save CH1-2 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	6	Save CH3-4 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	7	Save CH5-6 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	8	Save CH7-8 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1011	0	Restore Default	Max Subindex Number	UNSIGNED 8	RO	8
	1	Restore All Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	2	Restore Communication Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	3	Restore Application Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	4	Save Manufacturer Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	5	Restore CH1-2 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	6	Restore CH3-4 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	7	Restore CH5-6 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	8	Restore CH7-8 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
0x1014	0	COB-ID Emergency Object	COB-ID for Emergency Object	UNSIGNED 32	RO	NODEID+0x80
0x1018	0	Identity Object	Max Subindex Number	UNSIGNED 8	RO	4
	1	Vendor ID	Seneca srl	UNSIGNED 32	RO	0x00000249
	2	Product Code	Machine ID Code	UNSIGNED 32	RO	0x0000001C
	3	Revision Number	Revision	UNSIGNED 32	RO	0
	4	Serial Number	Serial Number Code	UNSIGNED 32	RO	0
0x1200	0	Server SDO Parameters	Max Subindex Number	UNSIGNED 8	RO	2
	1	Receive SDO COB-ID	COB-ID of Receive SDO	UNSIGNED 32	RO	NODEID + 0x600
	2	Transmit SDO COB-ID	COB-ID of Transmit SDO	UNSIGNED 32	RO	NODEID + 0x580

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1801	0	Transmit PDO2 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO 2	UNSIGNED 32	RW	NODEID + 0x40000280
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1802	0	Transmit PDO 3 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO 3	UNSIGNED 32	RW	NODEID + 0x40000380
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1803	0	Transmit PDO 4 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO4	UNSIGNED 32	RW	0xC0000000
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1804	0	Transmit PDO 4 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO5	UNSIGNED 32	RW	0xC0000000
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1A01	0	Transmit PDO2 Mapping	Max Subindex Number	UNSIGNED 8	RO	4
	1	Object NR1	First Object (default: CHANNEL 1 16 BITS INPUT)	UNSIGNED 32	RW	0x64010110 Object = 0x6401 subindex = 1 Length = 16 bit
	2	Object NR2	Second Object (default: CHANNEL 2 16 BITS INPUT)	UNSIGNED 32	RW	0x64010210 Object = 0x6401 subindex = 2 Length = 16 bit
	3	Object NR3	Third Object (default: CHANNEL 3 16 BITS INPUT)	UNSIGNED 32	RW	0x64010310 Object = 0x6401 subindex = 3 Length = 16 bit
	4	Object NR4	Fourth Object (default: CHANNEL 4 16 BITS INPUT)	UNSIGNED 32	RW	0x64010410 Object = 0x6401 subindex = 4 Length = 16 bit
0x1A02	0	Transmit PDO3 Mapping	Max Subindex Number	UNSIGNED 8	RO	4
	1	Object NR1	First Object (default: CHANNEL 5 16 BITS INPUT)	UNSIGNED 32	RW	0x64010510 Object = 0x6401 subindex = 5 Length = 16 bit
	2	Object NR2	Second Object (default: CHANNEL 6 16 BITS INPUT)	UNSIGNED 32	RW	0x64010610 Object = 0x6401 subindex = 6 Length = 16 bit
	3	Object NR3	Third Object (default: CHANNEL 7 16 BITS INPUT)	UNSIGNED 32	RW	0x64010710 Object = 0x6401 subindex = 7 Length = 16 bit
	4	Object NR4	Fourth Object (default: CHANNEL 8 16 BITS INPUT)	UNSIGNED 32	RW	0x64010810 Object = 0x6401 subindex = 8 Length = 16 bit

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1A03	0	Transmit PDO4 Mapping	Max Subindex Number	UNSIGNED 8	RO	4
	1	Object NR1	First Object (default: NONE)	UNSIGNED 32	RW	0
	2	Object NR2	Second Object (default: NONE)	UNSIGNED 32	RW	0
	3	Object NR3	Third Object (default: NONE)	UNSIGNED 32	RW	0
	4	Object NR4	Fourth Object (default: NONE)	UNSIGNED 32	RW	0
0x1A04	0	Transmit PDO5 Mapping	Max Subindex Number	UNSIGNED 8	RO	4
	1	Object NR1	First Object (default: NONE)	UNSIGNED 32	RW	0
	2	Object NR2	Second Object (default: NONE)	UNSIGNED 32	RW	0
	3	Object NR3	Third Object (default: NONE)	UNSIGNED 32	RW	0
	4	Object NR4	Fourth Object (default: NONE)	UNSIGNED 32	RW	0

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MANUFACTURER SPECIFIC PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2001	0	Module Address	Station Address (only if dip switch 4,5,6,7,8,9,10 are OFF)	UNSIGNED 8	RW	127
0x2002	0	Buad Rate	Station Baud Rate (only if dip switch 1,2,3 are OFF) 1 = 20Kbps 2 = 50Kbps 3 = 125Kbps 4 = 250Kbps 5 = 500Kbps 6 = 800Kbps 7 = 1Mbps	UNSIGNED 8	RW	7
0x2030	0	Device Temperature	Max Subindex Number	UNSIGNED 8	RO	4
	1	Internal Temperatue	Station internal Temperature [°C/10]	INTEGER 16	RO	0
	2	Hi Hi Temperature	Critical Hot Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	950
	3	Hi Temperature	Warning for Too Hot Temperature [°C/10]	INTEGER 16	RO	900
	4	Lo Temperature	Critical Low Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	-250
0x2100	0	Global Channels status	Channels 1..8 Status	UNSIGNED 16	RO	0
0x2106	0	Channels 1-2 Parameters	Max Subindex Number	UNSIGNED 8	RO	6
	1	Channel 1 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	2	Channel 2 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	3	Channel 1 Type	0 = V 1 = mA	UNSIGNED 8	RW	0
	4	Channel 2 Type	0 = V 1 = mA	UNSIGNED 8	RW	1
	5	Channel 1-2 Line frequency Rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	6	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2107	0	Channels 3-4 Parameters	Max Subindex Number	UNSIGNED 8	RO	6
	1	Channel 3 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	2	Channel 4 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	3	Channel 3 Type	0 = V 1 = mA	UNSIGNED 8	RW	0
	4	Channel 4 Type	0 = V 1 = mA	UNSIGNED 8	RW	1
	5	Channel 3-4 Line frequency Rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	6	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2
0x2108	0	Channels 5-6 Parameters	Max Subindex Number	UNSIGNED 8	RO	6
	1	Channel 5 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	2	Channel 6 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	3	Channel 5 Type	0 = V 1 = mA	UNSIGNED 8	RW	0
	4	Channel 6 Type	0 = V 1 = mA	UNSIGNED 8	RW	1
	5	Channel 5-6 Line frequency Rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	6	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2
0x2109	0	Channels 7-8 Parameters	Max Subindex Number	UNSIGNED 8	RO	6
	1	Channel 7 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	2	Channel 8 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	3	Channel 7 Type	0 = V 1 = mA	UNSIGNED 8	RW	0
	4	Channel 8 Type	0 = V 1 = mA	UNSIGNED 8	RW	1
	5	Channel 7-8 Line frequency Rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	6	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2700	0	BEGIN INTEGER SCALE	Max Subindex Number	UNSIGNED 8	RO	8
	1	Begin Scale CH1	Channel 1 Begin integer scale [mV] or [uA]	INTEGER 16	RW	0
	2	Begin Scale CH2	Channel 2 Begin integer scale [mV] or [uA]	INTEGER 16	RW	0
	3	Begin Scale CH3	Channel 3 Begin integer scale [mV] or [uA]	INTEGER 16	RW	0
	4	Begin Scale CH4	Channel 4 Begin integer scale [mV] or [uA]	INTEGER 16	RW	0
	5	Begin Scale CH5	Channel 5 Begin integer scale [mV] or [uA]	INTEGER 16	RW	0
	6	Begin Scale CH6	Channel 6 Begin integer scale [mV] or [uA]	INTEGER 16	RW	0
	7	Begin Scale CH7	Channel 7 Begin integer scale [mV] or [uA]	INTEGER 16	RW	0
	8	Begin Scale CH8	Channel 8 Begin integer scale [mV] or [uA]	INTEGER 16	RW	0
0x2701	0	END INTEGER SCALE	Max Subindex Number	UNSIGNED 8	RO	8
	1	End Scale CH1	Channel 1 End integer scale [mV] or [uA]	INTEGER 16	RW	10000
	2	End Scale CH2	Channel 2 End integer scale [mV] or [uA]	INTEGER 16	RW	10000
	3	End Scale CH3	Channel 3 End integer scale [mV] or [uA]	INTEGER 16	RW	10000
	4	End Scale CH4	Channel 4 End integer scale [mV] or [uA]	INTEGER 16	RW	10000
	5	End Scale CH5	Channel 5 End integer scale [mV] or [uA]	INTEGER 16	RW	10000
	6	End Scale CH6	Channel 6 End integer scale [mV] or [uA]	INTEGER 16	RW	10000
	7	End Scale CH7	Channel 7 End integer scale [mV] or [uA]	INTEGER 16	RW	10000
	8	End Scale CH8	Channel 8 End integer scale [mV] or [uA]	INTEGER 16	RW	10000

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STANDARD DEVICE PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6401	0	Channels Values Integer	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 value 16Bits	Channel 1 Value [mV] or [uA]	INTEGER 16	RO	0
	2	CH2 value 16Bits	Channel 2 Value [mV] or [uA]	INTEGER 16	RO	0
	3	CH3 value 16Bits	Channel 3 Value [mV] or [uA]	INTEGER 16	RO	0
	4	CH4 value 16Bits	Channel 4 Value [mV] or [uA]	INTEGER 16	RO	0
	5	CH5 value 16Bits	Channel 5 Value [mV] or [uA]	INTEGER 16	RO	0
	6	CH6 value 16Bits	Channel 6 Value [mV] or [uA]	INTEGER 16	RO	0
	7	CH7 value 16Bits	Channel 7 Value [mV] or [uA]	INTEGER 16	RO	0
	8	CH8 value 16Bits	Channel 8 Value [mV] or [uA]	INTEGER 16	RO	0
0x6403	0	Channels Values Real	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 value Real	Channel 1 Value [mV] or [uA]	REAL 32	RO	0
	2	CH2 value Real	Channel 2 Value [mV] or [uA]	REAL 32	RO	0
	3	CH3 value Real	Channel 3 Value [mV] or [uA]	REAL 32	RO	0
	4	CH4 value Real	Channel 4 Value [mV] or [uA]	REAL 32	RO	0
	5	CH5 value Real	Channel 5 Value [mV] or [uA]	REAL 32	RO	0
	6	CH6 value Real	Channel 6 Value [mV] or [uA]	REAL 32	RO	0
	7	CH7 value Real	Channel 7 Value [mV] or [uA]	REAL 32	RO	0
	8	CH8 value Real	Channel 8 Value [mV] or [uA]	REAL 32	RO	0
0x6423	0	Analogue Input Interrupt Global Enable	0 = Disable asynchronous TxPDO 1 = Enable asynchronous TxPDO	BOOLEAN	RW	0
0x6424	0	Integer Analogue Interrupt Upper Limit	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt upper value	Channel 1 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	10000
	2	CH2 Interrupt upper value	Channel 2 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	10000
	3	CH3 Interrupt upper value	Channel 3 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	10000
	4	CH4 Interrupt upper value	Channel 4 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	10000
	5	CH5 Interrupt upper value	Channel 5 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	10000
	6	CH6 Interrupt upper value	Channel 6 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	10000
	7	CH7 Interrupt upper value	Channel 7 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	10000
	8	CH8 Interrupt upper value	Channel 8 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	10000

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6425	0	Integer Analogue Interrupt lower Limit	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt lower value	Channel 1 integer analogue interrupt lower limit value [mV] or [uA]	INTEGER16	RW	0
	2	CH2 Interrupt lower value	Channel 2 integer analogue interrupt lower limit value [mV] or [uA]	INTEGER16	RW	0
	3	CH3 Interrupt lower value	Channel 3 integer analogue interrupt lower limit value [mV] or [uA]	INTEGER16	RW	0
	4	CH4 Interrupt lower value	Channel 4 integer analogue interrupt lower limit value [mV] or [uA]	INTEGER16	RW	0
	5	CH5 Interrupt lower value	Channel 5 integer analogue interrupt lower limit value [mV] or [uA]	INTEGER16	RW	0
	6	CH6 Interrupt lower value	Channel 6 integer analogue interrupt lower limit value [mV] or [uA]	INTEGER16	RW	0
	7	CH7 Interrupt lower value	Channel 7 integer analogue interrupt lower limit value [mV] or [uA]	INTEGER16	RW	0
	8	CH8 Interrupt lower value	Channel 8 integer analogue interrupt lower limit value [mV] or [uA]	INTEGER16	RW	0
0x6426	0	Unsigned Analogue Interrupt Delta	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt delta value	Channel 1 unsigned analogue interrupt delta value [mV] or [uA]	UNSIGNED 16	RW	0
	2	CH2 Interrupt delta value	Channel 2 unsigned analogue interrupt delta value [mV] or [uA]	UNSIGNED 16	RW	0
	3	CH3 Interrupt delta value	Channel 3 unsigned analogue interrupt delta value [mV] or [uA]	UNSIGNED 16	RW	0
	4	CH4 Interrupt delta value	Channel 4 unsigned analogue interrupt delta value [mV] or [uA]	UNSIGNED 16	RW	0
	5	CH5 Interrupt delta value	Channel 5 unsigned analogue interrupt delta value [mV] or [uA]	UNSIGNED 16	RW	0
	6	CH6 Interrupt delta value	Channel 6 unsigned analogue interrupt delta value [mV] or [uA]	UNSIGNED 16	RW	0
	7	CH7 Interrupt delta value	Channel 7 unsigned analogue interrupt delta value [mV] or [uA]	UNSIGNED 16	RW	0
	8	CH8 Interrupt delta value	Channel 8 unsigned analogue interrupt delta value [mV] or [uA]	UNSIGNED 16	RW	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6429	0	Float Analogue Interrupt upper Limit	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt upper value	Channel 1 float analogue interrupt upper limit value [mV] or [uA]	REAL 32	RW	10000.0
	2	CH2 Interrupt upper value	Channel 2 float analogue interrupt upper limit value [mV] or [uA]	REAL 32	RW	10000.0
	3	CH3 Interrupt upper value	Channel 3 float analogue interrupt upper limit value [mV] or [uA]	REAL 32	RW	10000.0
	4	CH4 Interrupt upper value	Channel 4 float analogue interrupt upper limit value [mV] or [uA]	REAL 32	RW	10000.0
	5	CH5 Interrupt upper value	Channel 5 float analogue interrupt upper limit value [mV] or [uA]	REAL 32	RW	10000.0
	6	CH6 Interrupt upper value	Channel 6 float analogue interrupt upper limit value [mV] or [uA]	REAL 32	RW	10000.0
	7	CH7 Interrupt upper value	Channel 7 float analogue interrupt upper limit value [mV] or [uA]	REAL 32	RW	10000.0
	8	CH8 Interrupt upper value	Channel 8 float analogue interrupt upper limit value [mV] or [uA]	REAL 32	RW	10000.0
0x642A	0	Float Analogue Interrupt lower Limit	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt lower value	Channel 1 float analogue interrupt lower limit value [mV] or [uA]	REAL 32	RW	0
	2	CH2 Interrupt lower value	Channel 2 float analogue interrupt lower limit value [mV] or [uA]	REAL 32	RW	0
	3	CH3 Interrupt lower value	Channel 3 float analogue interrupt lower limit value [mV] or [uA]	REAL 32	RW	0
	4	CH4 Interrupt lower value	Channel 4 float analogue interrupt lower limit value [mV] or [uA]	REAL 32	RW	0
	5	CH5 Interrupt lower value	Channel 5 float analogue interrupt lower limit value [mV] or [uA]	REAL 32	RW	0
	6	CH6 Interrupt lower value	Channel 6 float analogue interrupt lower limit value [mV] or [uA]	REAL 32	RW	0
	7	CH7 Interrupt lower value	Channel 7 float analogue interrupt lower limit value [mV] or [uA]	REAL 32	RW	0
	8	CH8 Interrupt lower value	Channel 8 float analogue interrupt lower limit value [mV] or [uA]	REAL 32	RW	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x642B	0	Float Analogue Interrupt Delta	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt Delta value	Channel 1 float analogue interrupt delta value [mV] or [uA]	REAL 32	RW	0
	2	CH2 Interrupt Delta value	Channel 2 float analogue interrupt delta limit value [mV] or [uA]	REAL 32	RW	0
	3	CH3 Interrupt Delta value	Channel 3 float analogue interrupt delta limit value [mV] or [uA]	REAL 32	RW	0
	4	CH4 Interrupt Delta value	Channel 4 float analogue interrupt delta limit value [mV] or [uA]	REAL 32	RW	0
	5	CH5 Interrupt Delta value	Channel 5 float analogue interrupt delta limit value [mV] or [uA]	REAL 32	RW	0
	6	CH6 Interrupt Delta value	Channel 6 float analogue interrupt delta limit value [mV] or [uA]	REAL 32	RW	0
	7	CH7 Interrupt Delta value	Channel 7 float analogue interrupt delta limit value [mV] or [uA]	REAL 32	RW	0
	8	CH8 Interrupt Delta value	Channel 8 float analogue interrupt delta limit value [mV] or [uA]	REAL 32	RW	0
0x6430	0	Analogue Input SI Unit	Max Subindex Number	UNSIGNED 8	RO	8
	1	Analogue Input SI Unit CH1	0xFD260000 = mV 0xFD040000 = uA	UNSIGNED32	RW	0xFD260000
	2	Analogue Input SI Unit CH2	0xFD260000 = mV 0xFD040000 = uA	UNSIGNED32	RW	0xFD260000
	3	Analogue Input SI Unit CH3	0xFD260000 = mV 0xFD040000 = uA	UNSIGNED32	RW	0xFD260000
	4	Analogue Input SI Unit CH4	0xFD260000 = mV 0xFD040000 = uA	UNSIGNED32	RW	0xFD260000
	5	Analogue Input SI Unit CH5	0xFD260000 = mV 0xFD040000 = uA	UNSIGNED32	RW	0xFD260000
	6	Analogue Input SI Unit CH6	0xFD260000 = mV 0xFD040000 = uA	UNSIGNED32	RW	0xFD260000
	7	Analogue Input SI Unit CH7	0xFD260000 = mV 0xFD040000 = uA	UNSIGNED32	RW	0xFD260000
	8	Analogue Input SI Unit CH8	0xFD260000 = mV 0xFD040000 = uA	UNSIGNED32	RW	0xFD260000

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EN

ZC - 3AO

CANopen I/O Module
3 Analog Voltage/Current Outputs converter

User Manual

Contents:

Features
PDOs
Emergency Message
Manufacturer Specific Objects
Led Description
Objects for Analog Data
Dip Switch Configuration
Interrupt Objects
Functional Diagrams
Object Dictionary

FEATURES

TECHNICAL DATA	
Baud rate	20, 50, 125, 250, 500, 800, 1000 Kbits/s
Typ Min to Max Output Time	20 ms for all 3 Outputs
Channel Range in Voltage mode	From -10.5 V to + 10.5 V
Channel Range in Current mode	From 0 to 20.5 mA
CANopen TECHNICAL DATA	
NMT	SLAVE
ERROR CONTROL	NODE GUARDING
NODE ID	HW SWITCH OR SOFTWARE
NUMBER OF PDO	1 RX
PDO MODES	Event Triggered, Sync (cyclic), Sync (acyclic)
PDO MAPPING	VARIABLE
PDO LINKING	SUPPORTED
NUMBER OF SDO	1 SERVER
ERROR MESSAGE	YES
SUPPORTED APPLICATION LAYER	CiA 301 v4.02
SUPPORTED PROFILE	CiA 401 v2.01

RPDO TRANSMISSIONS TYPE SUPPORTED

OBJECT VALUE 0x180x sub 2	TRANSMISSION TYPE
0	Synchronous - acyclic
From 1 to 240	Synchronous - cyclic
255	Asynchronous

PDOs MAPPING

OBJECTS FOR DEFAULT MAPPING				
PDO NR	**COB-ID**	MAPPED OBJECT	INDEX	SUBINDEX
RPDO 2	0x00000300 + NodeId	Output Value CH1 ±10000	0x6411	1
		Output Value CH2 ±10000	0x6411	2
		Output Value CH3 ±10000	0x6411	3

EMERGENCY MESSAGE

The Emergency message is composed by:
2 bytes of EEC (Emergency Error Code)
1 byte of ER (Error register)
A Maximum of 4 bytes of MEF (Manufacturer Error Filed Object 0x1002)

EEC (Emergency Error Code)	
CODE	DESCRIPTION
0x0000	No Error
0x1000	Generic error
0x4201	CPU Temperature over HOT STOP ERROR
0x4202	CPU Temperature over HOT STOP
0x4203	CPU Temperature under COLD ERROR
0x8110	Communication Can Overrun
0x8120	Error Passive
0x8130	Life Guard Error
0x8140	Recovered From Bus Off
0xFF10	General Input Channels Error
0xFF11	Command for Input Channels Error
0xFF20	CPU Error

ER (Error Register)							
BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT1	BIT 0
Generic	0	Voltage	Temperature	Communication	0	0	Manufacture

Where if a bit is 0 means no error

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For EEC code 0xFF10 the EMERGENCY MESSAGE is:

EMERGENCY MESSAGE				
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4
0xFF10		0x81	**MEF**	

With this MEF:

MEF (Manufacturer-specific Error Field) for EEC 0xFF10		
BIT	DESCRIPTION	OBJECT FOR ERROR DETAILS
15	DISABILITY CH1	0x2120 Subindex 1
14	DISABILITY CH2	0x2120 Subindex 2
13	DISABILITY CH3	0x2120 Subindex 3
12	NA	
11	CHANNEL 1 SATURATION	
10	CHANNEL 2 SATURATION	
9	CHANNEL 3 SATURATION	
8	NA	
7	COMMUNICATION ERROR	0x2121 Subindex 1
6	CHANNELS GLOBAL ERROR	
5..0	NA	

For "Voltage Error" the Emergency Message will be:

EMERGENCY MESSAGE				
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4
0xFF10		0x85	**OBJECT 0x2100**	

For a "Timeout command" or "Error Command" the Emergency Message will be:

EMERGENCY MESSAGE					
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	BYTE 5
0xFF11		0x81	**CHANNEL ID**	**Object 0x2103 Subindex CHANNELID**	

Where the meaning of CHANNEL ID is:

CHANNEL ID	
CHANNEL ID	DESCRIPTION
0x01	CHANNEL 1 / 2
0x02	CHANNEL 3 / 4
0x03	CHANNEL 5 / 6
0x04	CHANNEL 7 / 8

For "CPU ERROR" the Emergency Message will be:

EMERGENCY MESSAGE						
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	**BYTE 5**	BYTE 6
0xFF20		0X81	**Object 0x1002**			

OBJECT 0x1002: MANUFACTURER STATUS REGISTER

Object 0x1002 is the CPU status.

OBJECT 0x1002 : MANUFACTURER STATUS REGISTER	
BIT	DESCRIPTION
31..10	NA
9	Good Data Value
8	Precision Data Value
7..1	NA
0	FLASH CRC ERROR

OBJECT 0x1006: COMMUNICATION WINDOW LENGTH

OBJECT 0x1006 : COMMUNICATION WINDOW LENGTH	
MIN VAL [ms]	MAX VAL [ms]
10	10000

OBJECT 0x1007: SYNCHRONOUS WINDOW LENGTH

OBJECT 0x1007 : SYNCHRONOUS WINDOW LENGTH	
MIN VAL [ms]	MAX VAL [ms]
2	2000

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MANUFACTURE SPECIFIC PROFILE AREA

OBJECT 0x2001 NODE ADDRESS

If Hardware switches are in "from memory" mode the node address is selectable by object 0x2001.

NODE ADDRESS (Object 0x2001)	
OBJECT VALUE	DESCRIPTION
0..127	Node Address

OBJECT 0x2002 BAUD RATE

If Hardware switches are in "from memory" mode the baud rate is selectable by object 0x2002.

BAUD RATE (Object 0x2002)	
OBJECT VALUE	DESCRIPTION
1	20 Kbit/s
2	50 Kbit/s
3	125 Kbit/s
4	250 Kbit/s
5	500 Kbit/s
6	800 Kbit/s
7	1 Mbit/s

OBJECT 0x2030 CPU TEMPERATURE

Object can be used for monitoring the CPU temperature. The HOT STOP Temperature sends in pre-operational the station.

The HOT ERROR and the COLD ERROR Temperature sends the Emergency Object.

The Object is Read Only.

CPU TEMPERATURE (Object 0x2030)	
SUBINDEX	DESCRIPTION
1	Actual Temperature [°C/10]
2	Temperature for HOT STOP ERROR [°C/10] 95.0°C
3	Temperature for HOT ERROR [°C/10] 90.0°C
4	Temperature for COLD ERROR [°C/10] -25.0°C

OBJECT 0x2100: CHANNELS STATUS

Object 0x2100 contains the channels status:

CHANNELS STATUS (OBJECT 0x2100)	
BIT	DESCRIPTION
15	CHANNEL 1 DISABLE
14	CHANNEL 2 DISABLE
13	CHANNEL 3 DISABLE
12	NA
11	CHANNEL 1 SATURATION
10	CHANNEL 2 SATURATION
9	CHANNEL 3 SATURATION
8	NA
7	CHANNELS COMMUNICATION ERROR
6	CHANNELS FAIL
5 ... 0	NA

OBJECT 0x2106: CHANNELS CONFIGURATION

Object 0x2106 contains the channels configuration:

CHANNELS CONFIGURATION (Object 0x2106)	
SUBINDEX	DESCRIPTION
1	CHANNEL 1 ENABLE (0 = disabled, 1 = enabled)
2	CHANNEL 2 ENABLE (0 = disabled, 1 = enabled)
3	CHANNEL 3 ENABLE (0 = disabled, 1 = enabled)
4	CHANNEL 1 MODE (0 = Voltage, 1 = Current)
5	CHANNEL 2 MODE (0 = Voltage, 1 = Current)
6	CHANNEL 3 MODE (0 = Voltage, 1 = Current)
7	CHANNEL 1 FAULT ACTION (0 = last good, 1 = load preset)
8	CHANNEL 2 FAULT ACTION (0 = last good, 1 = load preset)
9	CHANNEL 3 FAULT ACTION (0 = last good, 1 = load preset)

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INTEGER SCALE PROCESS

Integer input objects can be scaled by a BEGIN (referred to 0 mV or 0 uA) for a 0 integer value and an END (referred to 10000 mV or 20000 uA) for a 10000 integer value.
The formula is:
Out = BGN + ((END-BGN)/10000)*VAL

OBJECT 0x2600: BEGIN FOR INTEGER SCALE

The Object sets the customization of the associated mV or uA output value to the 0 integer value.

BEGIN FOR INTEGER SCALE (Object 0x2700)	
SUBINDEX	DESCRIPTION
1	BEGIN VALUE FOR CHANNEL 1 [mv] or [uA]
2	BEGIN VALUE FOR CHANNEL 2 [mv] or [uA]
3	BEGIN VALUE FOR CHANNEL 3 [mv] or [uA]

OBJECT 0x2601: END FOR INTEGER SCALE

The Object sets the customization of the associated mV or uA output value to the 10000 integer value.

END FOR INTEGER SCALE (Object 0x2700)	
SUBINDEX	DESCRIPTION
1	END VALUE FOR CHANNEL 1 [mv] or [uA]
2	END VALUE FOR CHANNEL 2 [mv] or [uA]
3	END VALUE FOR CHANNEL 3 [mv] or [uA]

LED DESCRIPTION

SERVICE LED DESCRIPTION		
LED	STATE	DESCRIPTION
RUN	BLINKING	Pre-operational mode
	SINGLE FLASH	Stop mode
	ON	Operational mode
ERROR	SINGLE FLASH	At least one error counter has reached or exceeded the warning level
	DOUBLE FLASH	Guard Event
	TRIPLE FLASH	The SYNC hasn't received within the configurated communication cycle time out period
	ON	The Can controller is BUS OFF
	OFF	No error
FAIL	BLINKING	Data receiving from front jack
	ON	At least one channel is in error mode
POWER	ON	Power Supply

DIP SWITCH CONFIGURATION

DIP-SWITCH SETTINGS (CANopen PROTOCOL)

BAUD RATE		ADDRESS		
1 2 3	SOFTWARE PROGRAMMED	4 5 6 7 8 9 10	0000000	SOFTWARE PROGRAMMED
	20 kbps		0000001	ADD. 001
	50 kbps		0000010	ADD. 002
	125 kbps		0000011	ADD. 003
	250 kbps		0000100	ADD. 004
	500 kbps		0000101	ADD. 005
	800 kbps	.....	.....	.....
	1 Mbps		1111111	ADD. 127

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OBJECTS FOR ANALOG DATA

OBJECT 0x6411 OUTPUT VALUE

Object 0x6411 contains the ±10000 values for channels 1..3 (in agreement with objects 0x2600, 0x2601 and 0x2106). (±10000 for voltage mode, 0 - 10000 for current mode)

OUTPUT VALUE (OBJECT 0x6411)	
SUBINDEX	DESCRIPTION
1	Channel 1 ***±10000*** Output value
2	Channel 2 ***±10000*** Outputvalue
3	Channel 3 ***±10000*** Output value

OBJECT 0x6443 FAULT MODE OUTPUT

Object 0x6443 contains the fault mode for outputs.
If FAULT MODE = 0 Hold last value
If FAULT MODE = 1 Load object 0x6444 value.

FAULT OUTPUT VALUE (OBJECT 0x6443)	
SUBINDEX	DESCRIPTION
1	Channel 1 FAULT MODE
2	Channel 2 FAULT MODE
3	Channel 3 FAULT MODE

OBJECT 0x6444 FAULT OUTPUT VALUE

Object 0x6443 contains the ±10000 values for channels 1..3 to load in case of fault (in agreement with objects 0x2600, 0x2601 and 0x2106).
(±10000 for voltage mode, 0 - 10000 for current mode)

FAULT OUTPUT VALUE (OBJECT 0x6443)	
SUBINDEX	DESCRIPTION
1	Channel 1 fault Output value
2	Channel 2 fault Output value
3	Channel 3 fault Output value

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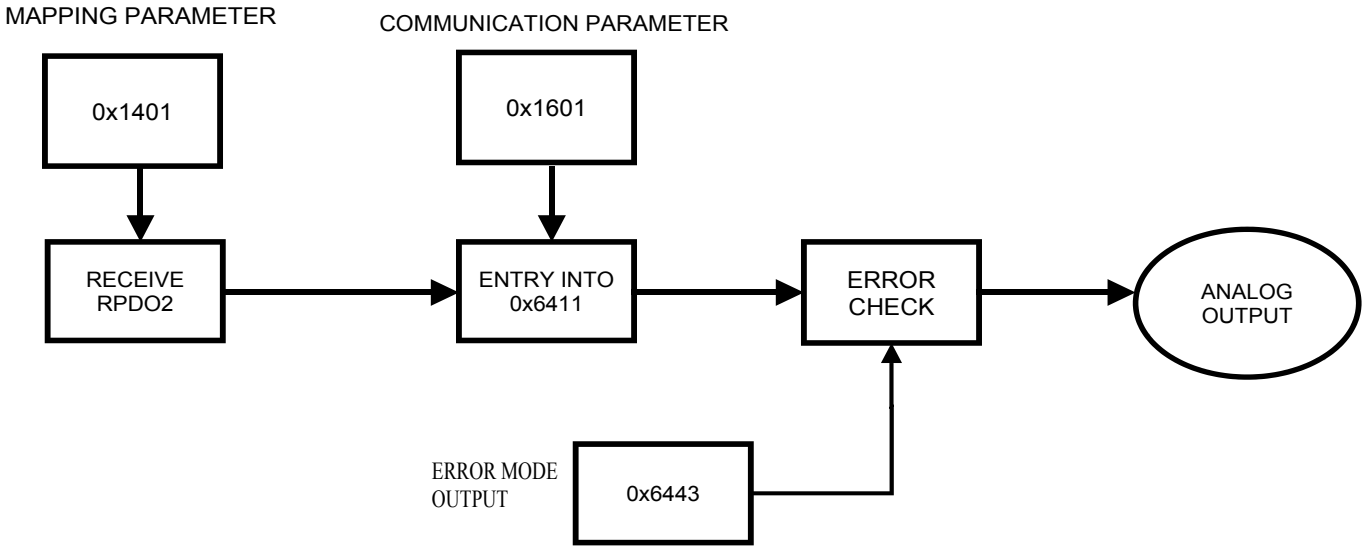
FUNCTIONAL DIAGRAM



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OBJECT DICTIONARY

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1000	0	Device Type	Device Type (Profile 401 = 0x191)	UNSIGNED 32	RO	0x00080191
0x1001	0	Error register	Error register (DS 401)	UNSIGNED 8	RO	0
0x1002	0	Manufacturer Status Register	Status Register	UNSIGNED 32	RO	0
0x1005	0	SYNC COB-ID	The device consumes the SYNC message	UNSIGNED 32	RW	0x80
0x1006	0	Communication Window Length	Sync interval [us]	UNSIGNED 32	RW	0
0x1007	0	Synchronous Window Length	Time window [us] for the PDO transmission after the SYNC	UNSIGNED 32	RW	0
0x1008	0	Manufacturer Device name	Device name	VISIBLE STRING	RO	“ZC-3AO”
0x1009	0	Manufacturer Hardware Version	Hardware version	VISIBLE STRING	RO	“SC000000”
0x100A	0	Manufacturer Software Version	Software version	VISIBLE STRING	RO	“SW001150”
0x100C	0	Guard Time	Guard Time [ms]	UNSIGNED 16	RW	0
0x100D	0	Life Time Factor	Max delay between two guarding telegrams = Guard_Time*Life_Time_Factor	UNSIGNED 8	RW	0
0x1010	0	Store Parameters	Max Subindex Number	UNSIGNED 8	RO	5
	1	Save All Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	2	Save Communication Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	3	Save Application Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	4	Save Manufacturer Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	5	Save CH1-2-3 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1011	0	Restore Default	Max Subindex Number	UNSIGNED 8	RO	5
	1	Restore All Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	2	Restore Communication Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	3	Restore Application Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	4	Save Manufacturer Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	5	Restore CH1-2-3 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
0x1014	0	COB-ID Emergency Object	COB-ID for Emergency Object	UNSIGNED 32	RO	NODEID+0x80
0x1018	0	Identity Object	Max Subindex Number	UNSIGNED 8	RO	4
	1	Vendor ID	Seneca srl	UNSIGNED 32	RO	0x00000249
	2	Product Code	Machine ID Code	UNSIGNED 32	RO	0x0000001E
	3	Revision Number	Revision	UNSIGNED 32	RO	0
	4	Serial Number	Serial Number Code	UNSIGNED 32	RO	0
0x1200	0	Server SDO Parameters	Max Subindex Number	UNSIGNED 8	RO	2
	1	Receive SDO COB-ID	COB-ID of Receive SDO	UNSIGNED 32	RO	NODEID + 0x600
	2	Transmit SDO COB-ID	COB-ID of Transmit SDO	UNSIGNED 32	RO	NODEID + 0x580

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1401	0	Receiver PDO2 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO 2	UNSIGNED 32	RW	0x300+NodeId
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	NOT USED FOR RXPDO	UNSIGNED 16	RW	0x0000
0x1A01	0	Receive PDO2 Mapping	Max Subindex Number	UNSIGNED 8	RO	3
	1	Object NR1	First Object (default: CHANNEL 1 +-10000 OUTPUT)	UNSIGNED 32	RW	0x64110110 Object = 0x6411 subindex = 1 Length = 16 bit
	2	Object NR2	Second Object (default: CHANNEL 2 +-10000 OUTPUT)	UNSIGNED 32	RW	0x64110210 Object = 0x6411 subindex = 2 Length = 16 bit
	3	Object NR3	Third Object (default: CHANNEL 3 +-10000 OUTPUT)	UNSIGNED 32	RW	0x64110310 Object = 0x6411 subindex = 3 Length = 16 bit

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MANUFACTURER SPECIFIC PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2001	0	Module Address	Station Address (only if dip switch 4,5,6,7,8,9,10 are OFF)	UNSIGNED 8	RW	127
0x2002	0	Buad Rate	Station Baud Rate (only if dip switch 1,2,3 are OFF) 1 = 20Kbps 2 = 50Kbps 3 = 125Kbps 4 = 250Kbps 5 = 500Kbps 6 = 800Kbps 7 = 1Mbps	UNSIGNED 8	RW	7
0x2030	0	Device Temperature	Max Subindex Number	UNSIGNED 8	RO	4
	1	Internal Temperature	Station internal Temperature [°C/10]	INTEGER 16	RO	0
	2	Hi Hi Temperature	Critical Hot Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	950
	3	Hi Temperature	Warning for Too Hot Temperature [°C/10]	INTEGER 16	RO	900
	4	Lo Temperature	Critical Low Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	-250
0x2106	0	Channels Configuration	Max Subindex Number	UNSIGNED 8	RO	6
	1	Channel 1 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	2	Channel 2 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	3	Channel 3 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	4	Channel 1 Mode	0 = Voltage 1 = Current	UNSIGNED 8	RW	0
	5	Channel 2 Mode	0 = Voltage 1 = Current	UNSIGNED 8	RW	0
	6	Channel 3 Mode	0 = Voltage 1 = Current	UNSIGNED 8	RW	0
0x2600	0	Begin integer Scale	Max Subindex Number	UNSIGNED 8	RO	3
	1	Begin scale CH1	Begin Scale [mV] or [uA]	INTEGER 16	RW	0
	2	Begin scale CH2	Begin Scale [mV] or [uA]	INTEGER 16	RW	0
	3	Begin scale CH3	Begin Scale [mV] or [uA]	INTEGER 16	RW	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2601	0	End integer Scale	Max Subindex Number	UNSIGNED 8	RO	3
	1	End scale CH1	End Scale [mV] or [uA]	INTEGER 16	RW	10000
	2	End scale CH2	End Scale [mV] or [uA]	INTEGER 16	RW	10000
	3	End scale CH3	End Scale [mV] or [uA]	INTEGER 16	RW	10000

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STANDARD DEVICE PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6411	0	Channels Outputs Values Integer	Max Subindex Number	UNSIGNED 8	RO	3
	1	CH1 value +-10000	Channel 1 Value +-10000 (From 0 to 10000 for current)	INTEGER 16	RW	0
	2	CH2 value +-10000	Channel 2 Value +-10000 (From 0 to +10000 for current)	INTEGER 16	RW	0
	3	CH3 value +-10000	Channel 3 Value +-10000 (From 0 to +10000 for current)	INTEGER 16	RW	0
0x6443	0	Output Channels Error Mode	Max Subindex Number	UNSIGNED 8	RO	3
	1	CH1 Error Mode	0 = Keep Last 1 = Load object 0x6444	UNSIGNED 8	RO	1
	2	CH2 Error Mode	0 = Keep Last 1 = Load object 0x6444	UNSIGNED 8	RO	1
	3	CH3 Error Mode	0 = Keep Last 1 = Load object 0x6444	UNSIGNED 8	RO	1
0x6444	0	Analog Output Error Value	Max Subindex Number	UNSIGNED 8	RO	3
	1	CH1 Error Value	Channel 1 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	0
	2	CH2 Error Value	Channel 2 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	0
	3	CH3 Error Value	Channel 3 integer analogue interrupt upper limit value [mV] or [uA]	INTEGER16	RW	0

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EN

ZC - 4RTD

CANopen I/O Module
4 RTD
or
4 Ohmeter
converter

User Manual

Contents:
Features
PDOs
Emergency Message
Manufacturer Specific Objects
Objects for Analog Data
Led Description
Dip Switch Configuration
Interrupt Objects
Functional Diagrams
Object Dictionary

FEATURES

TECHNICAL DATA	
Baud rate	20, 50, 125, 250, 500, 800, 1000 Kbits/s
Typical Conversion Time	20 ms for 4 Channels
RTD supported	PT100, NI100, PT500, PT1000.
Range in ohmeter mode	From 18 Ω to 1851 Ω
CANopen TECHNICAL DATA	
NMT	SLAVE
ERROR CONTROL	NODE GUARDING
NODE ID	HW SWITCH OR SOFTWARE
NUMBER OF PDO	2 TX
PDO MODES	Event Triggered, Sync (cyclic), Sync (acyclic)
PDO MAPPING	VARIABLE
PDO LINKING	SUPPORTED
NUMBER OF SDO	1 SERVER
ERROR MESSAGE	YES
SUPPORTED APPLICATION LAYER	CiA 301 v4.02
SUPPORTED PROFILE	CiA 401 v2.01

SUPPORTED RTD

PT100 - EN60751/A2 (ITS-90)		PT1000 - EN60751/A2 (ITS-90)	
Temperature Range	**-200°C +600°C**	**Temperature Range**	**-200°C +210°C**
PT500 - EN60751/A2 (ITS-90)		**NI100**	
Temperature Range	**-200°C +750°C**	**Temperature Range**	**-60°C +250°C**

TPDO TRANSMISSIONS TYPE SUPPORTED

OBJECT VALUE 0x180x sub 2	TRANSMISSION TYPE
0	Synchronous - acyclic
From 1 to 240	Synchronous - cyclic
255	Asynchronous

PDOs MAPPING

OBJECTS FOR DEFAULT MAPPING				
PDO NR	**COB-ID**	**MAPPED OBJECT**	**INDEX**	**SUBINDEX**
TPDO 2	0x40000280 + NodeId	Value CH1 16 bit	0x6401	1
		Value CH2 16 bit	0x6401	2
		Value CH3 16 bit	0x6401	3
		Value CH4 16 bit	0x6401	4
TPDO 3	0x40000380 + NodeId	Value CH1 float	0x6403	1
		Value CH2 float	0x6403	2

Note that a TPDO COB-ID must begin with 0x4

EMERGENCY MESSAGE

The Emergency message is composed by:
2 bytes of EEC (Emergency Error Code)
1 byte of ER (Error register)
Max of 5 bytes of MEF (Manufacturer Error Filed, Object 0x2100)

EEC (Emergency Error Code)	
CODE	DESCRIPTION
0x0000	No Error
0x1000	Generic error
0x4201	CPU Temperature over HOT STOP ERROR
0x4202	CPU Temperature over HOT STOP
0x4203	CPU Temperature under COLD ERROR
0x8110	Communication Can Overrun
0x8120	Error Passive
0x8130	Life Guard Error
0x8140	Recovered From Bus Off
0xFF10	General Input Channels Error
0xFF11	Command for Input Channels Error
0xFF20	CPU Error

ER (Error Register)							
BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT1	BIT 0
Generic		Voltage	Temperature	Communication			Manufacture

Where if a bit is 0 means no error

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For EEC code 0xFF10 the EMERGENCY MESSAGE is:

EMERGENCY MESSAGE				
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4
0xFF10		0x81	**MEF**	

With MEF:

MEF (Manufacturer-specific Error Field) for EEC 0xFF10		
BIT	DESCRIPTION	OBJECT FOR ERROR DETAILS
15	CHANNEL1 FAIL	0x2120 Subindex 1
14	CHANNEL 2 FAIL	0x2120 Subindex 2
13	CHANNEL 3 FAIL	0x2120 Subindex 3
12	CHANNEL 4 FAIL	0x2120 Subindex 4
11	CHANNEL 1 SENSOR ERROR	0x2120 Subindex 1
10	CHANNEL 2 SENSOR ERROR	0x2120 Subindex 1
9	CHANNEL 3 SENSOR ERROR	0x2120 Subindex 2
8	CHANNEL 4 SENSOR ERROR	0x2120 Subindex 2
7	CHANNEL 1 COMMUNICATION FAIL	0x2121 Subindex 1
6	CHANNEL 2 COMMUNICATION FAIL	0x2121 Subindex 2
5	CHANNEL 3 COMMUNICATION FAIL	0x2121 Subindex 3
4	CHANNEL 4 COMMUNICATION FAIL	0x2121 Subindex 4

For "Voltage Error" the Emergency Message will be:

EMERGENCY MESSAGE				
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4
0xFF10		0x85	**OBJECT 0x2100**	

For "Timeout command" or "Error Command" the Emergency Message will be:

EMERGENCY MESSAGE					
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	BYTE 5
0xFF11		0x81	**CHANNEL NR**	**Object 0x2103 Subindex CHANNEL NR**	

For "CPU ERROR" the Emergency Message will be:

EMERGENCY MESSAGE						
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	**BYTE 5**	BYTE 6
0xFF20		0X81	**Object 0x1002**			

OBJECT 0x1002: MANUFACTURER STATUS REGISTER

Object 0x1002 is the CPU status.

OBJECT 0x1002 : MANUFACTURER STATUS REGISTER	
BIT	DESCRIPTION
31..10	NA
9	Good Data Value
8	Precision Data Value
7..1	NA
0	FLASH CRC ERROR

OBJECT 0x1006: COMMUNICATION WINDOW LENGTH

OBJECT 0x1006 : COMMUNICATION WINDOW LENGTH	
MIN VAL [ms]	MAX VAL [ms]
10	10000

OBJECT 0x1007: SYNCHRONOUS WINDOW LENGTH

OBJECT 0x1007 : SYNCHRONOUS WINDOW LENGTH	
MIN VAL [ms]	MAX VAL [ms]
2	2000

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MANUFACTURE SPECIFIC PROFILE AREA

OBJECT 0x2001 NODE ADDRESS

If hardware switches are in "from memory" mode the node address is selectable by object 0x2001.

NODE ADDRESS (Object 0x2001)	
OBJECT VALUE	DESCRIPTION
0..127	Node Address

OBJECT 0x2002 BAUD RATE

If Hardware switches are in "from memory" mode the baud rate is selectable by object 0x2002.

BAUD RATE (Object 0x2002)	
OBJECT VALUE	DESCRIPTION
1	20 Kbit/s
2	50 Kbit/s
3	125 Kbit/s
4	250 Kbit/s
5	500 Kbit/s
6	800 Kbit/s
7	1 Mbit/s

OBJECT 0x2030 CPU TEMPERATURE

Object can be used for monitoring the CPU temperature. The HOT STOP Temperature sends in pre-operational the station.

The HOT ERROR and the COLD ERROR Temperature sends the Emergency Object.

The Object is Read Only.

CPU TEMPERATURE (Object 0x2030)	
SUBINDEX	DESCRIPTION
1	Actual Temperature [°C/10]
2	Temperature for HOT STOP ERROR [°C/10] 95.0°C
3	Temperature for HOT ERROR [°C/10] 90.0°C
4	Temperature for COLD ERROR [°C/10] -25.0°C

OBJECT 0x2100: CHANNELS GLOBAL STATUS

Object 0x2100 contains the channels status:

CHANNELS STATUS (OBJECT 0x2100)		
BIT	DESCRIPTION	OBJECT FOR ERROR DETAILS
15	CHANNEL 1 FAIL	0x2120 Subindex 1
14	CHANNEL 2 FAIL	0x2120 Subindex 2
13	CHANNEL 3 FAIL	0x2120 Subindex 3
12	CHANNEL 4 FAIL	0x2120 Subindex 4
11	CHANNEL 1 SENSOR ERROR	0x2120 Subindex 1
10	CHANNEL 1 SENSOR ERROR	0x2120 Subindex 1
9	CHANNEL 1 SENSOR ERROR	0x2120 Subindex 2
8	CHANNEL 1 SENSOR ERROR	0x2120 Subindex 2
7	CHANNEL 1 COMMUNICATION FAIL	0x2121 Subindex 1
6	CHANNEL 2 COMMUNICATION FAIL	0x2121 Subindex 2
5	CHANNEL 3 COMMUNICATION FAIL	0x2121 Subindex 3
4	CHANNEL 4 COMMUNICATION FAIL	0x2121 Subindex 4
3..0	NA	NA

OBJECT 0x2106 - 0x2107 - 0x2108 - 0x2109: CHANNELS SETUP

Object s 0x2106 , 0x2107, 0x2108 and 0x2109 contains the channels configuration:

CHANNELS SETUP (Object 0x2106 - 0x2107 - 0x2108 - 0x2109)	
SUBINDEX	DESCRIPTION
1	RTD SENSOR TYPE 0 = PT100 1 = NI100 2 = PT500 3 = PT1000
2	MEASURE TYPE (0 = °C 1 = Ω)
3	THREE WIRES CONNECTION 0 = two or four wires connection 1 = three wires connection
4	FREQUENCY REJECTION (1 = 60Hz 0 = 50 Hz)
5	FILTER VALUE
6	CHANNEL ENABLE 0 = CHANNEL DISABLED 1 = CHANNEL ENABLED

FILTER VALUES	
VALUE	**FILTER TYPE**
0	DISABLED
1	AVERAGE FILTER
2	HIRES + AVERAGE FILTER
3	HIRES + AVERAGE + EXPONENTIAL (LEVEL 1) FILTER
..	..
7	HIRES + AVERAGE + EXPONENTIAL (LEVEL 5) FILTER

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OBJECT 0x2125 FAULT ACTIONS

Object 0x2125 sets the fault actions.

FAULT ACTIONS (Object 0x2125)	
BIT	DESCRIPTION
15	FAULT ACTION CH1 0=load 0x2160 1= last good
14	FAULT ACTION CH2 0=load 0x2160 1= last good
13	FAULT ACTION CH3 0=load 0x2160 1= last good
12	FAULT ACTION CH4 0=load 0x2160 1= last good

OBJECT 0x2160: FAULT VALUES

Object 0x2360 contains the floating point value (32 bit) to load in fault case.
In agreement with object 0x2106 the measure unit can be in °C or Ω.

FAULT VALUES (OBJECT 0x2160)	
SUBINDEX	DESCRIPTION
1	CHANNEL 1 FAULT VALUE
2	CHANNEL 2 FAULT VALUE
3	CHANNEL 3 FAULT VALUE
4	CHANNEL 4 FAULT VALUE

DIP SWITCH CONFIGURATION

DIP-SWITCH SETTINGS (CANopen PROTOCOL)

KEY

BAUD RATE (1 2 3)		ADDRESS (4 5 6 7 8 9 10)		
SOFTWARE PROGRAMMED		0000000	SOFTWARE PROGRAMMED	
20 kbps		0000001	ADD. 001	
50 kbps		0000010	ADD. 002	
125 kbps		0000011	ADD. 003	
250 kbps		0000100	ADD. 004	
500 kbps		0000101	ADD. 005	
800 kbps		.....	.....	
1 Mbps		1111111	ADD. 127	

LED DESCRIPTION

SERVICE LED DESCRIPTION			
LED		STATE	DESCRIPTION
RUN		BLINKING	Pre-operational mode
		SINGLE FLASH	Stop mode
		ON	Operational mode
ERROR		SINGLE FLASH	At least one error counter has reached or exceeded the warning level
		DOUBLE FLASH	Guard Event
		TRIPLE FLASH	The SYNC hasn't received within the configurated communication cycle time out period
		ON	The Can controller is BUS OFF
		OFF	No error
FAIL		BLINKING	Data receiving from front jack
		ON	At least one channel is in error mode
POWER		ON	Power Supply

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OBJECTS FOR ANALOG DATA

OBJECT 0x6401 16 BIT INPUT VALUE

Object 0x6401 contains the 16 bit (signed) values for channels 1..8 in [°C/10] or [Ω/10] (in agreement with object 0x2106).

16 BIT INTEGER INPUT (OBJECT 0x6401)	
SUBINDEX	DESCRIPTION
1	Channel 1 16bit Input value
2	Channel 2 16bit Input value
3	Channel 3 16bit Input value
4	Channel 4 16bit Input value

OBJECT 0x6403 FLOAT INPUT VALUE

Object 0x6403 contains the floating point (32 bit) values for channels 1..8 in [°C] or [Ω] (in agreement with object 0x2106).

32 BIT REAL INTEGER INPUT (OBJECT 0x6403)	
SUBINDEX	DESCRIPTION
1	Channel 1 floating point value
2	Channel 2 floating point value
3	Channel 3 floating point value
4	Channel 4 floating point value

OBJECT 0x6423 INTERRUPT ENABLE

If the value is "1" the station can generate asynchronous TxPDO.
If the value is "0" the station can't generate asynchronous TxPDO.

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OBJECT 0x6424 INTERRUPT UPPER LIMIT INTEGER

If enabled (see object 0x6423), an interrupt is triggered when the analogue input is equal or rises above the given value. As long as the trigger condition is met, every change of the analogue input data generates a new interrupt if interrupt delta (Object 0x6426) is't also true.

INTERRUPT UPPER LIMIT 16 BIT INTEGER (OBJECT 0x6424)	
SUBINDEX	DESCRIPTION
1	Channel 1 upper limit integer [°C/10] or [Ω/10]
2	Channel 2 upper limit integer [°C/10] or [Ω/10]
3	Channel 3 upper limit integer [°C/10] or [Ω/10]
4	Channel 4 upper limit integer [°C/10] or [Ω/10]

OBJECT 0x6425 INTERRUPT LOWER LIMIT INTEGER

If enabled (see 0x6423 object), an interrupt is triggered when the analogue input falls below the given value. As long as the trigger condition is met, every change of the analogue input data generates a new interrupt if interrupt delta (Object 0x6426) is't also true.

INTERRUPT LOWER LIMIT 16 BIT INTEGER (OBJECT 0x6425)	
SUBINDEX	DESCRIPTION
1	Channel 1 lower limit integer [°C/10] or [Ω/10]
2	Channel 2 lower limit integer [°C/10] or [Ω/10]
3	Channel 3 lower limit integer [°C/10] or [Ω/10]
4	Channel 4 lower limit integer [°C/10] or [Ω/10]

OBJECT 0x6426 INTERRUPT DELTA UNSIGNED

This object sets the delta value (rising or falling above or below the last communicated value) for interrupt-enabled analogue inputs (if Object 0x6423 enables the interrupt).

INTERRUPT DELTA UNSIGNED INTEGER 16 BIT (OBJECT 0x6426)	
SUBINDEX	DESCRIPTION
1	Channel 1 delta unsigned [°C/10] or [Ω/10]
2	Channel 2 delta unsigned [°C/10] or [Ω/10]
3	Channel 3 delta unsigned [°C/10] or [Ω/10]
4	Channel 4 delta unsigned [°C/10] or [Ω/10]

OBJECT 0x6429 INTERRUPT UPPER LIMIT FLOAT (32 BIT)

This object sets the converted upper limits for interrupt-enabled analogue inputs (see 0x6423 object). As long as the trigger condition is met, every change of the analogue input data generates a new interrupt if interrupt delta (Object 0x642B) is't also true.

INTERRUPT UPPER LIMIT 32 BIT FLOAT (OBJECT 0x6429)	
SUBINDEX	DESCRIPTION
1	Channel 1 upper limit float [°C] or [Ω]
2	Channel 2 upper limit float [°C] or [Ω]
3	Channel 3 upper limit float [°C] or [Ω]
4	Channel 4 upper limit float [°C] or [Ω]

OBJECT 0x642A INTERRUPT LOWER LIMIT FLOAT (32BIT)

This object sets the lower limits for interrupt-enabled analogue inputs (see 0x6423 object). As long as the trigger condition is met, every change of the analogue input data generates a new interrupt if interrupt delta (Object 0x642B) is't also true.

INTERRUPT LOWER LIMIT 16 BIT INTEGER (OBJECT 0x6425)	
SUBINDEX	DESCRIPTION
1	Channel 1 lower limit float [°C] or [Ω]
2	Channel 2 lower limit float [°C] or [Ω]
3	Channel 3 lower limit float [°C] or [Ω]
4	Channel 4 lower limit float [°C] or [Ω]

OBJECT 0x642B INTERRUPT DELTA FLOAT (32 BIT)

This object sets the delta value (rising or falling above or below the last sample) in Float format for interrupt-enabled analogue inputs (if Object 0x6423 enables the interrupt).

INTERRUPT DELTA FLOAT 32 BIT (OBJECT 0x642B)	
SUBINDEX	DESCRIPTION
1	Channel 1 delta float[°C] or [Ω]
2	Channel 2 delta float[°C] or [Ω]
3	Channel 3 delta float[°C] or [Ω]
4	Channel 4 delta float[°C] or [Ω]

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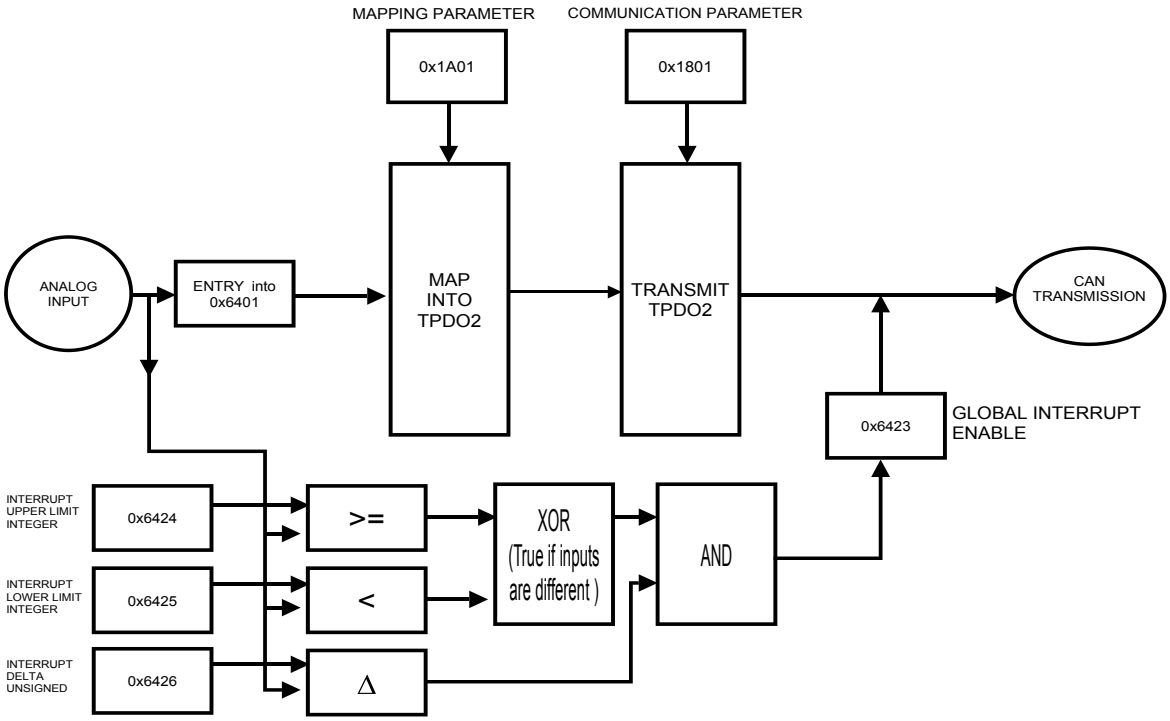
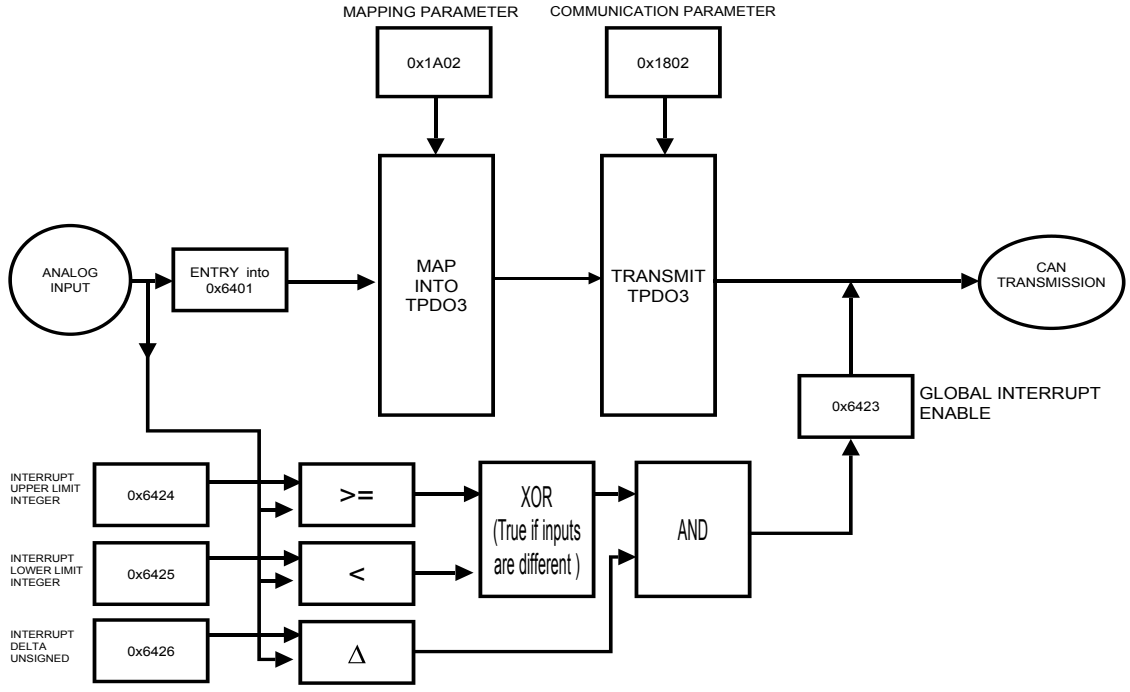
FUNCTIONAL DIAGRAM FOR INTEGER VALUES



FUNCTIONAL DIAGRAM FOR FLOAT VALUES



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OBJECT DICTIONARY

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1000	0	Device Type	Device Type (Profile 401 = 0x191)	UNSIGNED 32	RO	0x00040191
0x1001	0	Error register	Error register (DS 401)	UNSIGNED 8	RO	0
0x1002	0	Manufacturer Status Register	Status Register	UNSIGNED 32	RO	0
0x1005	0	SYNC COB-ID	The device consumes the SYNC message	UNSIGNED 32	RW	0x80
0x1006	0	Communication Window Length	Sync interval [us]	UNSIGNED 32	RW	0
0x1007	0	Synchronous Window Length	Time window [us] for the PDO transmission after the SYNC	UNSIGNED 32	RW	0
0x1008	0	Manufacturer Device name	Device name	VISIBLE STRING	RO	“ZC-4RTD”
0x1009	0	Manufacturer Hardware Version	Hardware version	VISIBLE STRING	RO	“SC000000”
0x100A	0	Manufacturer Software Version	Software version	VISIBLE STRING	RO	“SW001120”
0x100C	0	Guard Time	Guard Time [ms]	UNSIGNED 16	RW	0
0x100D	0	Life Time Factor	Max delay between two guarding telegrams = Guard_Time*Life_Time_Factor	UNSIGNED 8	RW	0
0x1010	0	Store Parameters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Save All Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	2	Save Communication Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	3	Save Application Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	4	Save Manufacturer Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	5	Save CH1 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	6	Save CH2 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	7	Save CH3 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	8	Save CH4 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1

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INDEX	SUB	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1011	0	Restore Default	Max Subindex Number	UNSIGNED 8	RO	8
	1	Restore All Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	2	Restore Communication Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	3	Restore Application Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	4	Save Manufacturer Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	5	Restore CH1 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	6	Restore CH2 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	7	Restore CH3 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	8	Restore CH4 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
0x1014	0	COB-ID Emergency Object	COB-ID for Emergency Object	UNSIGNED 32	RO	NODEID+0x80
0x1018	0	Identity Object	Max Subindex Number	UNSIGNED 8	RO	4
	1	Vendor ID	Seneca srl	UNSIGNED 32	RO	0x00000249
	2	Product Code	Machine ID Code	UNSIGNED 32	RO	0x0000001B
	3	Revision Number	Revision	UNSIGNED 32	RO	0
	4	Serial Number	Serial Number Code	UNSIGNED 32	RO	0
0x1200	0	Server SDO Parameters	Max Subindex Number	UNSIGNED 8	RO	2
	1	Receive SDO COB-ID	COB-ID of Receive SDO	UNSIGNED 32	RO	NODEID + 0x600
	2	Transmit SDO COB-ID	COB-ID of Transmit SDO	UNSIGNED 32	RO	NODEID + 0x580

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INDEX	SUB	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1801	0	Transmit PDO2 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO5	UNSIGNED 32	RW	NODEID + 0x40000280
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1802	0	Transmit PDO3 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO6	UNSIGNED 32	RW	0xC0000000
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000

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INDEX	SUB	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1A01	0	Transmit PDO2 Mapping	Max Subindex Number	UNSIGNED 8	RO	4
	1	Object NR1	First Object (default:: CHANNEL 1 16 BITS INPUT)	UNSIGNED 32	RW	0x64010110 Object = 0x6401 subindex = 1 Length = 16 bit
	2	Object NR2	Second Object (default:: CHANNEL 2 16 BITS INPUT)	UNSIGNED 32	RW	0x64010210 Object = 0x6401 subindex = 2 Length = 16 bit
	3	Object NR3	Third Object (default:: CHANNEL 3 16 BITS INPUT)	UNSIGNED 32	RW	0x64010310 Object = 0x6401 subindex = 3 Length = 16 bit
	4	Object NR4	Fourth Object (default:: CHANNEL 4 16 BITS INPUT)	UNSIGNED 32	RW	0x64010410 Object = 0x6401 subindex = 4 Length = 16 bit
0x1A02	0	Transmit PDO3 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default:: NONE)	REAL32	RW	0
	2	Object NR2	Second Object (default:: NONE)	REAL32	RW	0

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MANUFACTURER SPECIFIC PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2001	0	Module Address	Station Address (only if dip switch 4,5,6,7,8,9,10 are OFF)	UNSIGNED 8	RW	127
0x2002	0	Buad Rate	Station Baud Rate (only if dip switch 1,2,3 are OFF) 1 = 20Kbps 2 = 50Kbps 3 = 125Kbps 4 = 250Kbps 5 = 500Kbps 6 = 800Kbps 7 = 1Mbps	UNSIGNED 8	RW	7
0x2030	0	Device Temperature	Max Subindex Number	UNSIGNED 8	RO	4
	1	Internal Temperatue	Station internal Temperature [°C/10]	INTEGER 16	RO	0
	2	Hi Hi Temperature	Critical Hot Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	950
	3	Hi Temperature	Warning for Too Hot Temperature [°C/10]	INTEGER 16	RO	900
	4	Lo Temperature	Critical Low Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	-250
0x2100	0	Channels Global Status	Channels Global Status	UNSIGNED 16	RO	0
0x2104	0	Channels CMD	Max Subindex Number	UNSIGNED 8	RO	4
	1	CMD CH1	Writing 0xC0DE will return the Channel fw code into 0x2105	UNSIGNED 16	RW	0
	2	CMD CH2	Writing 0xC0DE will return the Channel fw code into 0x2105	UNSIGNED 16	RW	0
	3	CMD CH3	Writing 0xC0DE will return the Channel fw code into 0x2105	UNSIGNED 16	RW	0
	4	CMD CH4	Writing 0xC0DE will return the Channel fw code into 0x2105	UNSIGNED 16	RW	0
0x2105	0	Channels AUX CMD	Max Subindex Number	UNSIGNED 8	RO	4
	1	AUX CMD CH1	FW Code Return value	UNSIGNED 16	RW	0
	2	AUX CMD CH2	FW Code Return value	UNSIGNED 16	RW	0
	3	AUX CMD CH3	FW Code Return value	UNSIGNED 16	RW	0
	4	AUX CMD CH4	FW Code Return value	UNSIGNED 16	RW	0
0x2106	0	Channel 1 Parameters	Max Subindex Number	UNSIGNED 8	RO	5
	1	Sensor Type	RTD TYPE 0 = PT100, 1=NI100, 2 = PT500, 3 = PT1000	UNSIGNED 8	RW	0
	2	Measure Unit	0 = °C, 1 = Ω	UNSIGNED 8	RW	0
	3	3 Wires Connection	0 = 2 or 4 wires connection 1 = 3 wires connection	UNSIGNED 8	RW	1
	4	Frequency rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	5	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2
	6	Channel 1 Enable	0 = Channel Disabled 1 = Channel Enabled	UNSIGNED 8	RW	1

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INDEX	SUB	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2107	0	Channel 2 Parameters	Max Subindex Number	UNSIGNED 8	RO	5
	1	Sensor Type	RTD TYPE 0 = PT100, 1=NI100, 2 = PT500, 3 = PT1000	UNSIGNED 8	RW	0
	2	Measure Unit	0 = °C, 1 = Ω	UNSIGNED 8	RW	0
	3	3 Wires Connection	0 = 2 or 4 wires connection 1 = 3 wires connection	UNSIGNED 8	RW	1
	4	Frequency rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	5	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2
	6	Channel 2 Enable	0 = Channel Disabled 1 = Channel Enabled	UNSIGNED 8	RW	1
0x2108	0	Channel 3 Parameters	Max Subindex Number	UNSIGNED 8	RO	5
	1	Sensor Type	RTD TYPE 0 = PT100, 1=NI100, 2 = PT500, 3 = PT1000	UNSIGNED 8	RW	0
	2	Measure Unit	0 = °C, 1 = Ω	UNSIGNED 8	RW	0
	3	3 Wires Connection	0 = 2 or 4 wires connection 1 = 3 wires connection	UNSIGNED 8	RW	1
	4	Frequency rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	5	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2
	6	Channel 3 Enable	0 = Channel Disabled 1 = Channel Enabled	UNSIGNED 8	RW	1
0x2109	0	Channel 4 Parameters	Max Subindex Number	UNSIGNED 8	RO	5
	1	Sensor Type	RTD TYPE 0 = PT100, 1=NI100, 2 = PT500, 3 = PT1000	UNSIGNED 8	RW	0
	2	Measure Unit	0 = °C, 1 = Ω	UNSIGNED 8	RW	0
	3	3 Wires Connection	0 = 2 or 4 wires connection 1 = 3 wires connection	UNSIGNED 8	RW	1
	4	Frequency rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	5	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2
	6	Channel 4 Enable	0 = Channel Disabled 1 = Channel Enabled	UNSIGNED 8	RW	1
0x2125	0	Fault Actions mask	1 = last good 0 = load object 0x2160 Bit 11..0 Not used	UNSIGNED 8	RW	0xF000

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2154	0	3TH Wire Resist-ence Value [Ω/100]	Max Subindex Number	UNSIGNED 8	RO	4
	1	Channel 1 - 3TH Wire Resistence Value [Ω/100]	3TH Wire Resistence Value [Ω/100]	UNSIGNED 16	RO	0
	2	Channel 2 - 3TH Wire Resistence Value [Ω/100]	3TH Wire Resistence Value [Ω/100]	UNSIGNED 16	RO	0
	3	Channel 3 - 3TH Wire Resistence Value [Ω/100]	3TH Wire Resistence Value [Ω/100]	UNSIGNED 16	RO	0
	4	Channel 4 - 3TH Wire Resistence Value [Ω/100]	3TH Wire Resistence Value [Ω/100]	UNSIGNED 16	RO	0
0x2160	0	Fault value	Max Subindex Number	UNSIGNED 8	RO	4
	1	Channel 1 Fault Value [°C/Ω]	Channel 1 Fault Value [°C/Ω] Float	FLOAT	RW	850.0
	2	Channel 1 Fault Value [°C/Ω]	Channel 2 Fault Value [°C/Ω] Float	FLOAT	RW	850.0
	3	Channel 1 Fault Value [°C/Ω]	Channel 3 Fault Value [°C/Ω] Float	FLOAT	RW	850.0
	4	Channel 1 Fault Value [°C/Ω]	Channel 4 Fault Value [°C/Ω] Float	FLOAT	RW	850.0

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STANDARD DEVICE PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6401	0	Channels Values Integer	Max Subindex Number	UNSIGNED 8	RO	4
	1	CH1 value 16Bits	Channel 1 Value [°C/10] or	INTEGER 16	RO	0
	2	CH2 value 16Bits	Channel 2 Value [°C/10] or	INTEGER 16	RO	0
	3	CH3 value 16Bits	Channel 3 Value [°C/10] or [Ω/10]	INTEGER 16	RO	0
	4	CH4 value 16Bits	Channel 4 Value [°C/10] or	INTEGER 16	RO	0
0x6403	0	Channels Values Real	Max Subindex Number	UNSIGNED 8	RO	4
	1	CH1 value Real	Channel 1 Value [°C] or [Ω]	REAL 32	RO	0
	2	CH2 value Real	Channel 2 Value [°C] or [Ω]	REAL 32	RO	0
	3	CH3 value Real	Channel 3 Value [°C] or [Ω]	REAL 32	RO	0
	4	CH4 value Real	Channel 4 Value [°C] or [Ω]	REAL 32	RO	0
0x6423	0	Analogue Input Interrupt Global Enable	0 = Disable asynchronous TxPDO 1 = Enable asynchronous TxPDO	BOOLEAN	RW	0
0x6424	0	Integer Analogue Interrupt Upper Limit	Max Subindex Number	UNSIGNED 8	RO	4
	1	CH1 Interrupt upper value	Channel 1 integer analogue interrupt upper limit value [°C/10] or [Ω/10]	INTEGER16	RW	8500
	2	CH2 Interrupt upper value	Channel 2 integer analogue interrupt upper limit value [°C/10] or [Ω/10]	INTEGER16	RW	8500
	3	CH3 Interrupt upper value	Channel 3 integer analogue interrupt upper limit value [°C/10] or [Ω/10]	INTEGER16	RW	8500
	4	CH4 Interrupt upper value	Channel 4 integer analogue interrupt upper limit value [°C/10] or [Ω/10]	INTEGER16	RW	8500
0x6425	0	Integer Analogue Interrupt lower Limit	Max Subindex Number	UNSIGNED 8	RO	4
	1	CH1 Interrupt lower value	Channel 1 integer analogue interrupt lower limit value [°C/10] or [Ω/10]	INTEGER16	RW	-250
	2	CH2 Interrupt lower value	Channel 2 integer analogue interrupt lower limit value [°C/10] or [Ω/10]	INTEGER16	RW	-250
	3	CH3 Interrupt lower value	Channel 3 integer analogue interrupt lower limit value [°C/10] or [Ω/10]	INTEGER16	RW	-250
	4	CH4 Interrupt lower value	Channel 4 integer analogue interrupt lower limit value [°C/10] or [Ω/10]	INTEGER16	RW	-250

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6426	0	Unsigned Analogue Interrupt Delta	Max Subindex Number	UNSIGNED 8	RO	4
	1	CH1 Interrupt delta value	Channel 1 unsigned analogue interrupt delta value [°C/10] or [[Ω/10]]	UNSIGNED 16	RW	0
	2	CH2 Interrupt delta value	Channel 2 unsigned analogue interrupt delta value [°C/10] or [[Ω/10]]	UNSIGNED 16	RW	0
	3	CH3 Interrupt delta value	Channel 3 unsigned analogue interrupt delta value [°C/10] or [[Ω/10]]	UNSIGNED 16	RW	0
	4	CH4 Interrupt delta value	Channel 4 unsigned analogue interrupt delta value [°C/10] or [[Ω/10]]	UNSIGNED 16	RW	0
0x6429	0	Float Analogue Interrupt upper Limit	Max Subindex Number	UNSIGNED 8	RO	4
	1	CH1 Interrupt upper value	Channel 1 float analogue interrupt upper limit value[°C] or [Ω]	REAL 32	RW	850.0
	2	CH2 Interrupt upper value	Channel 2 float analogue interrupt upper limit value[°C] or [Ω]	REAL 32	RW	850.0
	3	CH3 Interrupt upper value	Channel 3 float analogue interrupt upper limit value[°C] or [Ω]	REAL 32	RW	850.0
	4	CH4 Interrupt upper value	Channel 4 float analogue interrupt upper limit value[°C] or [Ω]	REAL 32	RW	850.0
0x642A	0	Integer Analogue Interrupt lower Limit	Max Subindex Number	UNSIGNED 8	RO	4
	1	CH1 Interrupt lower value	Channel 1 integer analogue interrupt lower limit value [°C/10] or [Ω]	INTEGER16	RW	-250.0
	2	CH2 Interrupt lower value	Channel 2 integer analogue interrupt lower limit value [°C/10] or [Ω]	INTEGER16	RW	-250.0
	3	CH3 Interrupt lower value	Channel 3 integer analogue interrupt lower limit value [°C/10] or [Ω]	INTEGER16	RW	-250.0
	4	CH4 Interrupt lower value	Channel 4 integer analogue interrupt lower limit value [°C/10] or [Ω]	INTEGER16	RW	-250.0
0x642B	0	Float Analogue Interrupt Delta	Max Subindex Number	UNSIGNED 8	RO	4
	1	CH1 Interrupt Delta value	Channel 1 float analogue interrupt delta value [°C] or [Ω]	REAL 32	RW	0
	2	CH2 Interrupt Delta value	Channel 2 float analogue interrupt delta limit value [°C] or[Ω]	REAL 32	RW	0
	3	CH3 Interrupt Delta value	Channel 3 float analogue interrupt delta limit value [°C] or [Ω]	REAL 32	RW	0
	4	CH4 Interrupt Delta value	Channel 4 float analogue interrupt delta limit value [°C] or [Ω]	REAL 32	RW	0

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EN

ZC - 8TC

CANopen I/O Module
8 Thermocouple
or
8 mVoltmeter
Analog inputs

User Manual

Contents:
Features
PDOs
Emergency Message
Manufacturer Specific Objects
Led Description
Objects for Analog Data
Dip Switch Configuration
Interrupt Objects
Functional Diagrams
Object Dictionary

FEATURES

TECHNICAL DATA	
Baud rate	20, 50, 125, 250, 500, 800, 1000 Kbits/s
Typical Conversion Time	20 ms for 4 Channels / 40ms for 8 Channels
Thermocouple supported	J, K, R, S, T, B, E, N
Range in mVoltmeter mode	From -10.1 mV to + 81.4 mV
Built-in Cold Junction Compensation	YES (Configurable)
CANopen TECHNICAL DATA	
NMT	SLAVE
ERROR CONTROL	NODE GUARDING
NODE ID	HW SWITCH OR SOFTWARE
NUMBER OF PDO	4 TX
PDO MODES	Event Triggered, Sync (cyclic), Sync (acyclic)
PDO MAPPING	VARIABLE
PDO LINKING	SUPPORTED
NUMBER OF SDO	1 SERVER
ERROR MESSAGE	YES
SUPPORTED APPLICATION LAYER	CiA 301 v4.02
SUPPORTED PROFILE	CiA 401 v2.01

SUPPORTED THERMOCUPLES		
TC TYPE	RANGE	LINEARIZATION ERROR
J	-210 – 1200°C	0,05 °C
K	-200 – 1372 °C	0,05 °C
R	-50 – 1768 °C	0,02 °C
S	-50 – 1768 °C	0,02 °C
T	-200 – 400 °C	0,04 °
B	250 – 1820 °C	0,03 °C
E	-200 – 1000 °C	0,02 °C
N	-200 – 1300°C	0,04 °C

TPDO TRANSMISSIONS TYPE SUPPORTED

OBJECT VALUE 0x180x sub 2	TRANSMISSION TYPE
0	Synchronous - acyclic
From 1 to 240	Synchronous - cyclic
255	Asynchronous

PDOs MAPPING

OBJECTS FOR DEFAULT MAPPING				
PDO NR	COB-ID	MAPPED OBJECT	INDEX	SUBINDEX
TPDO 2	0x40000280 + NodeId	Value CH1 16 bits	0x6401	1
		Value CH2 16 bits	0x6401	2
		Value CH3 16 bits	0x6401	3
		Value CH4 16 bits	0x6401	4
TPDO 3	0x40000380 + NodeId	Value CH5 16 bits	0x6401	5
		Value CH6 16 bits	0x6401	6
		Value CH7 16 bits	0x6401	7
		Value CH8 16 bits	0x6401	8

Note that a TPDO COB-ID must start with 0x4

EMERGENCY MESSAGE

The Emergency message is composed by:
2 bytes of EEC (Emergency Error Code)
1 byte of ER (Error register)
A Maximum of 4 bytes of MEF (Manufacturer Error Filed Object 0x1002)

EEC (Emergency Error Code)	
CODE	DESCRIPTION
0x0000	No Error
0x1000	Generic error
0x4201	CPU Temperature over HOT STOP ERROR
0x4202	CPU Temperature over HOT STOP
0x4203	CPU Temperature under COLD ERROR
0x8110	Communication Can Overrun
0x8120	Error Passive
0x8130	Life Guard Error
0x8140	Recovered From Bus Off
0xFF10	General Input Channels Error
0xFF11	Command for Input Channels Error
0xFF20	CPU Error

ER (Error Register)							
BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT1	BIT 0
Generic	0	0	Temperature	Communication	0	0	Manifacture

Where if a bit is 0 means no error

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For EEC code 0xFF10 the EMERGENCY MESSAGE is:

EMERGENCY MESSAGE				
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4
0xFF10		0x81	**MEF**	

With this MEF:

MEF (Manufacturer-specific Error Field) for EEC 0xFF10		
BIT	DESCRIPTION	OBJECT FOR ERROR DETAILS
15	CHANNEL 1 / 2 FAIL	0x2120 Subindex 1
14	CHANNEL 3 / 4 FAIL	0x2120 Subindex 2
13	CHANNEL 5 / 6 FAIL	0x2120 Subindex 3
12	CHANNEL 7 / 8 FAIL	0x2120 Subindex 4
11	CHANNEL 1 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 1
10	CHANNEL 2 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 1
9	CHANNEL 3 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 2
8	CHANNEL 4 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 2
7	CHANNEL 5 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 3
6	CHANNEL 6 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 3
5	CHANNEL 7 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 4
4	CHANNEL 8 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 4
3	CHANNEL 1 / 2 COMMUNICATION FAIL	0x2121 Subindex 1
2	CHANNEL 3 / 4 COMMUNICATION FAIL	0x2121 Subindex 2
1	CHANNEL 5 / 6 COMMUNICATION FAIL	0x2121 Subindex 3
0	CHANNEL 7 / 8 COMMUNICATION FAIL	0x2121 Subindex 4

For "Voltage Error" the Emergency Message will be:

EMERGENCY MESSAGE				
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4
0xFF10		0x85	**OBJECT 0x2100**	

For "Timeout command" or "Error Command" the Emergency Message will be:

EMERGENCY MESSAGE					
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	BYTE 5
0xFF11		0x81	**CHANNEL ID**	**Object 0x2103 Subindex CHANNELID**	

Where the meaning of CHANNEL ID is:

CHANNEL ID	
CHANNEL ID	DESCRIPTION
0x01	CHANNEL 1 / 2
0x02	CHANNEL 3 / 4
0x03	CHANNEL 5 / 6
0x04	CHANNEL 7 / 8

For "CPU Error" the Emergency Message will be:

EMERGENCY MESSAGE						
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	**BYTE 5**	BYTE 6
0xFF20		0X81	**Object 0x1002**			

OBJECT 0x1002: MANUFACTURER STATUS REGISTER

Object 0x1002 is the CPU status.

OBJECT 0x1002 : MANUFACTURER STATUS REGISTER	
BIT	DESCRIPTION
31..10	NA
9	Good Data Value
8	Precision Data Value
7..1	NA
0	FLASH CRC ERROR

OBJECT 0x1006: COMMUNICATION WINDOW LENGTH

OBJECT 0x1006 : COMMUNICATION WINDOW LENGTH	
MIN VAL [ms]	MAX VAL [ms]
10	10000

OBJECT 0x1007: SYNCHRONOUS WINDOW LENGTH

OBJECT 0x1006 : COMMUNICATION WINDOW LENGTH	
MIN VAL [ms]	MAX VAL [ms]
2	2000

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MANUFACTURER SPECIFIC PROFILE AREA

OBJECT 0x2001 NODE ADDRESS

If Hardware switches are in "from memory" mode the node address is selectable by object 0x2001.

NODE ADDRESS (Object 0x2001)	
OBJECT VALUE	DESCRIPTION
0..127	Node Address

OBJECT 0x2002 Baud Rate

If Hardware switches are in "from memory" mode the baud rate is selectable by object 0x2002.

BAUD RATE (Object 0x2002)	
OBJECT VALUE	DESCRIPTION
1	20 Kbit/s
2	50 Kbit/s
3	125 Kbit/s
4	250 Kbit/s
5	500 Kbit/s
6	800 Kbit/s
7	1 Mbit/s

OBJECT 0x2030 CPU TEMPERATURE

Object can be used for monitoring the CPU temperature. The HOT STOP Temperature sends in pre-operational the station.

The HOT ERROR and the COLD ERROR Temperature sends the Emergency Object.

The Object is Read Only.

CPU TEMPERATURE (Object 0x2030)	
SUBINDEX	DESCRIPTION
1	Actual Temperature [°C/10]
2	Temperature for HOT STOP ERROR [°C/10] 95.0°C
3	Temperature for HOT ERROR [°C/10] 90.0°C
4	Temperature for COLD ERROR [°C/10] -25.0°C

OBJECT 0x2100: CHANNELS STATUS

Object 0x2100 contains the channels status:

CHANNELS STATUS (OBJECT 0x2100)		
BIT	DESCRIPTION	OBJECT FOR ERROR DETAILS
15 (MSB)	CHANNEL 1 / 2 FAIL	0x2120 Subindex 1
14	CHANNEL 3 / 4 FAIL	0x2120 Subindex 2
13	CHANNEL 5 / 6 FAIL	0x2120 Subindex 3
12	CHANNEL 7 / 8 FAIL	0x2120 Subindex 4
11	CHANNEL 1 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 1
10	CHANNEL 2 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 1
9	CHANNEL 3 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 2
8	CHANNEL 4 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 2
7	CHANNEL 5 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 3
6	CHANNEL 6 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 3
5	CHANNEL 7 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 4
4	CHANNEL 8 NOT CONNECTED OR ACQUISITION ERROR	0x2120 Subindex 4
3	CHANNEL 1 / 2 COMMUNICATION FAIL	0x2121 Subindex 1
2	CHANNEL 3 / 4 COMMUNICATION FAIL	0x2121 Subindex 2
1	CHANNEL 5 / 6 COMMUNICATION FAIL	0x2121 Subindex 3
0 (LSB)	CHANNEL 7 / 8 COMMUNICATION FAIL	0x2121 Subindex 4

OBJECT 0x2106 - 0x2107 - 0x2108 - 0x2109: CHANNELS CONFIGURATION

Object 0x2106 contains the channels 1-2 configurations:

CHANNELS 1-2 CONFIGURATIONS (Object 0x2106)	
SUBINDEX	DESCRIPTION
1	CHANNEL A ENABLE (1 = enable 0 = disable)
2	CHANNEL B ENABLE (1 = enable 0 = disable)
3	DATA TYPE (1 = mV 0 = temperature)
4	COLD JUNCTION ENABLE (1 = enable 0 = disable)
5	FREQUENCY REJECTION (1 = 60Hz 0 = 50 Hz)
6	FILTER
7	CHANNEL A THERMOCOUPLE TYPE
8	CHANNEL B THERMOCOUPLE TYPE

Objects 0x2107, 0x2108, 0x2109 contain respective the channels 3-4, 5-6, 7-8 configurations.

FILTER VALUES	
VALUE	**FILTER TYPE**
0	DISABLED
1	AVERAGE FILTER
2	HIRES + AVERAGE FILTER
3	HIRES + AVERAGE + EXPONENTIAL (LEVEL 1) FILTER
..	..
7	HIRES + AVERAGE + EXPONENTIAL (LEVEL 5) FILTER

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THERMOCOUPLE TYPE	
VALUE	THERMOCOUPLE TYPE
0	TYPE J
1	TYPE K
2	TYPE R
3	TYPE S
4	TYPE T
5	TYPE B
6	TYPE E
7	TYPE N

OBJECT 0x2125 FAULT ACTIONS

Object 0x2125 sets the fault actions.

FAULT ACTIONS (Object 0x2125)	
BIT	DESCRIPTION
15	FAULT ACTION CH1 0=load 0x2360 1= last good
14	FAULT ACTION CH2 0=load 0x2360 1= last good
13	FAULT ACTION CH3 0=load 0x2360 1= last good
12	FAULT ACTION CH4 0=load 0x2360 1= last good
11	FAULT ACTION CH5 0=load 0x2360 1= last good
10	FAULT ACTION CH6 0=load 0x2360 1= last good
9	FAULT ACTION CH7 0=load 0x2360 1= last good
8	FAULT ACTION CH8 0=load 0x2360 1= last good

OBJECT 0x2354: COLD JUNCTION TEMPERATURE

Object 0x2354 contains the cold junction temperature for each channel:

COLD JUNCTION TEMPERATURE (OBJECT 0x2354)	
SUBINDEX	DESCRIPTION
1	CHANNELS 1-2 COLD JUNCTION TEMPERATURE [°C/10]
2	CHANNELS 3-4 COLD JUNCTION TEMPERATURE [°C/10]
3	CHANNELS 5-6 COLD JUNCTION TEMPERATURE [°C/10]
4	CHANNELS 7-8 COLD JUNCTION TEMPERATURE [°C/10]

OBJECT 0x2360: FAULT VALUES

Object 0x2360 contains the floating point value (32 bit) to use in fault case (in agreement with object 0x2125). In agreement with object 0x2106 the measure unit can be in °C or mV.

FAULT VALUES (OBJECT 0x2360)	
SUBINDEX	DESCRIPTION
1	CHANNEL 1 FAULT VALUE
2	CHANNEL 2 FAULT VALUE
3	CHANNEL 3 FAULT VALUE
4	CHANNEL 4 FAULT VALUE
5	CHANNEL 5 FAULT VALUE
6	CHANNEL 6 FAULT VALUE
7	CHANNEL 7 FAULT VALUE
8	CHANNEL 8 FAULT VALUE

LED DESCRIPTION

SERVICE LED DESCRIPTION		
LED	STATE	DESCRIPTION
RUN	BLINKING	Pre-operational mode
	SINGLE FLASH	Stop mode
	ON	Operational mode
ERROR	SINGLE FLASH	At least one error counter has reached or exceeded the warning level
	DOUBLE FLASH	Guard Event
	TRIPLE FLASH	The SYNC hasn't received within the configurated communication cycle time out period
	ON	The Can controller is BUS OFF
	OFF	No error
FAIL	BLINKING	Data receiving from front jack
	ON	At least one channel is in error mode
POWER	ON	Power Supply

DIP SWITCH CONFIGURATION

DIP-SWITCH SETTINGS (CANopen PROTOCOL)

BAUD RATE		ADDRESS	
1 2 3	SOFTWARE PROGRAMMED	4 5 6 7 8 9 10	SOFTWARE PROGRAMMED
	20 kbps	0000001	ADD. 001
	50 kbps	0000010	ADD. 002
	125 kbps	0000011	ADD. 003
	250 kbps	0000100	ADD. 004
	500 kbps	0000101	ADD. 005
	800 kbps	.....	.....
	1 Mbps	1111111	ADD. 127
		0000000	

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OBJECTS FOR ANALOG DATA

OBJECT 0x6401 16 BIT INPUT VALUE

Object 0x6401 contains the 16 bit (signed) values for channels 1..8 in [°C/10] or [mV/100] (in agreement with object 0x2106).

16 BIT INTEGER INPUT (OBJECT 0x6401)	
SUBINDEX	DESCRIPTION
1	Channel 1 16bit Input value
2	Channel 2 16bit Input value
3	Channel 3 16bit Input value
4	Channel 4 16bit Input value
5	Channel 5 16bit Input value
6	Channel 6 16bit Input value
7	Channel 7 16bit Input value
8	Channel 8 16bit Input value

OBJECT 0x6403 32 BIT INPUT VALUE

Object 0x6403 contanins the real (32 bits) values for channels 1..8 in [°C] or [mV] (in agreement with object 0x2106).

32 BIT REAL INTEGER INPUT (OBJECT 0x6403)	
SUBINDEX	DESCRIPTION
1	Channel 1 real Input value
2	Channel 2 real Input value
3	Channel 3 real Input value
4	Channel 4 real Input value
5	Channel 5 real Input value
6	Channel 6 real Input value
7	Channel 7 real Input value
8	Channel 8 real Input value

OBJECT 0x6423 INTERRUPT ENABLE

If Object = "1" the station can generate asynchronous TxPDO.
Else if Object = "0" the station can't generate asynchronous TxPDO.

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OBJECT 0x6424 INTERRUPT UPPER LIMIT INTEGER

If enabled (see 0x6423 object), an interrupt is triggered when the analogue input is equal or rises above the given value. As long as the trigger condition is met, every change of the analogue input data generates a new interrupt only if interrupt delta (Object 0x6426) is also true.

INTERRUPT UPPER LIMIT 16 BIT INTEGER (OBJECT 0x6424)	
SUBINDEX	DESCRIPTION
1	Channel 1 upper limit integer [°C/10] or [mV/100]
2	Channel 2 upper limit integer [°C/10] or [mV/100]
3	Channel 3 upper limit integer [°C/10] or [mV/100]
4	Channel 4 upper limit integer [°C/10] or [mV/100]
5	Channel 5 upper limit integer [°C/10] or [mV/100]
6	Channel 6 upper limit integer [°C/10] or [mV/100]
7	Channel 7 upper limit integer [°C/10] or [mV/100]
8	Channel 8 upper limit integer [°C/10] or [mV/100]

OBJECT 0x6425 INTERRUPT LOWER LIMIT INTEGER

If enabled (see 0x6423 object), an interrupt is triggered when the analogue input falls below the given value. As long as the trigger condition is met, every change of the analogue input data generates a new interrupt onlyif interrupt delta (Object 0x6426) is also true.

INTERRUPT LOWER LIMIT 16 BIT INTEGER (OBJECT 0x6425)	
SUBINDEX	DESCRIPTION
1	Channel 1 lower limit integer [°C/10] or [mV/100]
2	Channel 2 lower limit integer [°C/10] or [mV/100]
3	Channel 3 lower limit integer [°C/10] or [mV/100]
4	Channel 4 lower limit integer [°C/10] or [mV/100]
5	Channel 5 lower limit integer [°C/10] or [mV/100]
6	Channel 6 lower limit integer [°C/10] or [mV/100]
7	Channel 7 lower limit integer [°C/10] or [mV/100]
8	Channel 8 lower limit integer [°C/10] or [mV/100]

OBJECT 0x6426 INTERRUPT DELTA UNSIGNED

This object sets the delta value (rising or falling above or below the last communicated value) for interrupt-enabled analogue inputs (if Object 0x6423 enables the interrupt).

INTERRUPT DELTA UNSIGNED INTEGER 16 BIT (OBJECT 0x6426)	
SUBINDEX	DESCRIPTION
1	Channel 1 delta unsigned [°C/10] or [mV/100]
2	Channel 2 delta unsigned [°C/10] or [mV/100]
3	Channel 3 delta unsigned [°C/10] or [mV/100]
4	Channel 4 delta unsigned [°C/10] or [mV/100]
5	Channel 5 delta unsigned [°C/10] or [mV/100]
6	Channel 6 delta unsigned [°C/10] or [mV/100]
7	Channel 7 delta unsigned [°C/10] or [mV/100]
8	Channel 8 delta unsigned [°C/10] or [mV/100]

OBJECT 0x6429 INTERRUPT UPPER LIMIT FLOAT (32 BIT)

This object sets the converted upper limits for interrupt-enabled analogue inputs (see 0x6423 object). As long as the trigger condition is met, every change of the analogue input data generates a new interrupt only if interrupt delta (Object 0x642B) is also true.

INTERRUPT UPPER LIMIT 32 BIT FLOAT (OBJECT 0x6429)	
SUBINDEX	DESCRIPTION
1	Channel 1 upper limit float [°C] or [uV]
2	Channel 2 upper limit float [°C] or [uV]
3	Channel 3 upper limit float [°C] or [uV]
4	Channel 4 upper limit float [°C] or [uV]
5	Channel 5 upper limit float [°C] or [uV]
6	Channel 6 upper limit float [°C] or [uV]
7	Channel 7 upper limit float [°C] or [uV]
8	Channel 8 upper limit float [°C] or [uV]

OBJECT 0x642A INTERRUPT LOWER LIMIT FLOAT (32BIT)

This object sets the lower limits for interrupt-enabled analogue inputs (see 0x6423 object). As long as the trigger condition is met, every change of the analogue input data generates a new interrupt only if interrupt delta (Object 0x642B) is also true.

INTERRUPT LOWER LIMIT 16 BIT INTEGER (OBJECT 0x6425)	
SUBINDEX	DESCRIPTION
1	Channel 1 lower limit float [°C] or [uV]
2	Channel 2 lower limit float [°C] or [uV]
3	Channel 3 lower limit float [°C] or [uV]
4	Channel 4 lower limit float [°C] or [uV]
5	Channel 5 lower limit float [°C] or [uV]
6	Channel 6 lower limit float [°C] or [uV]
7	Channel 7 lower limit float [°C] or [uV]
8	Channel 8 lower limit float [°C] or [uV]

OBJECT 0x642B INTERRUPT DELTA FLOAT (32 BIT)

This object sets the delta value (rising or falling above or below the last sample) in Float format for interrupt-enabled analogue inputs (if Object 0x6423 enables the interrupt).

INTERRUPT DELTA FLOAT 32 BIT (OBJECT 0x642B)	
SUBINDEX	DESCRIPTION
1	Channel 1 delta float[°C] or [mV]
2	Channel 2 delta float[°C] or [mV]
3	Channel 3 delta float[°C] or [mV]
4	Channel 4 delta float[°C] or [mV]
5	Channel 5 delta float[°C] or [mV]
6	Channel 6 delta float[°C] or [mV]
7	Channel 7 delta float[°C] or [mV]
8	Channel 8 delta float[°C] or [mV]

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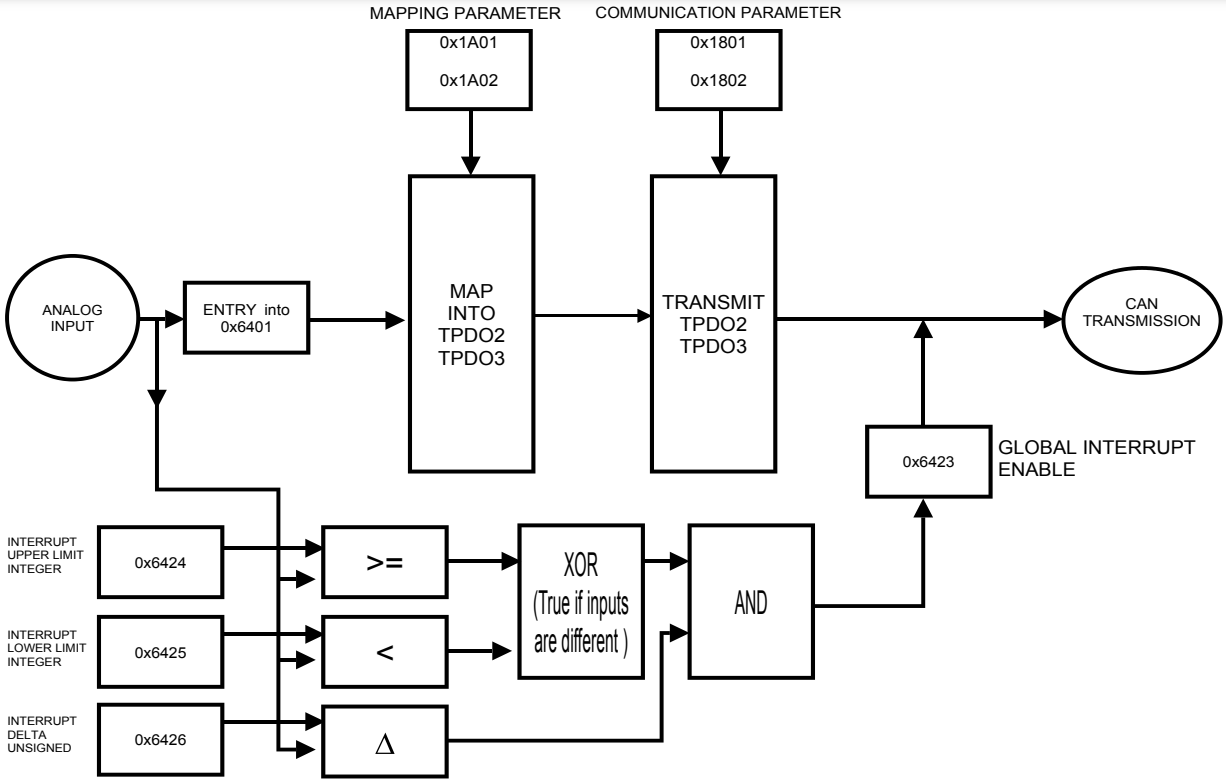
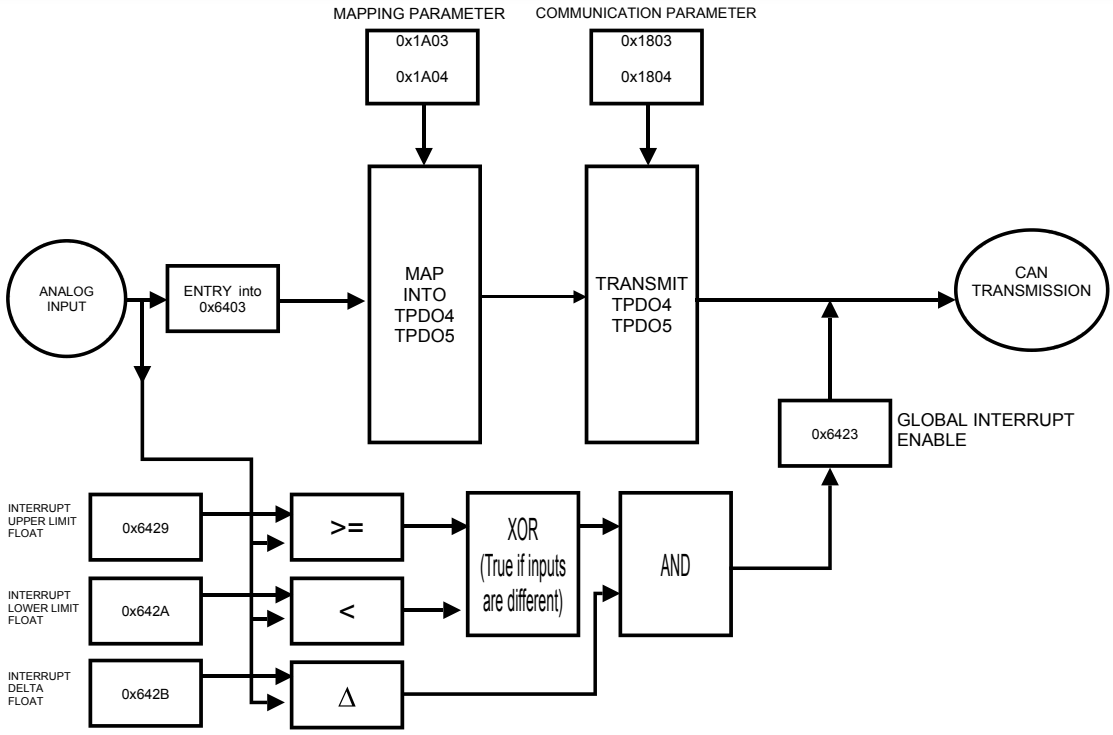
FUNCTIONAL DIAGRAM FOR INTEGER VALUES



FUNCTIONAL DIAGRAM FOR FLOAT VALUES



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OBJECT DICTIONARY

COMMUNICATION PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1000	0	Device Type	Device Type (Profile 401 = 0x191)	UNSIGNED 32	RO	0x00010191
0x1001	0	Error register	Error register (DS 401)	UNSIGNED 8	RO	0
0x1002	0	Manufacturer Status Register	Status Register	UNSIGNED 32	RO	0
0x1005	0	SYNC COB-ID	The device consumes the SYNC message	UNSIGNED 32	RW	0x80
0x1006	0	Communication Window Length	Sync interval [us]	UNSIGNED 32	RW	0
0x1007	0	Synchronous Window Length	Time window [us] for the PDO transmission after the SYNC	UNSIGNED 32	RW	0
0x1008	0	Manufacturer Device name	Device name	VISIBLE STRING	RO	“ZC-8TC”
0x1009	0	Manufacturer Hardware Version	Hardware version	VISIBLE STRING	RO	“SC000000”
0x100A	0	Manufacturer Software Version	Software version	VISIBLE STRING	RO	“SW001130”
0x100C	0	Guard Time	Guard Time [ms]	UNSIGNED 16	RW	0
0x100D	0	Life Time Factor	Max delay between two guarding telegrams = Guard_Time*Life_Time_Factor	UNSIGNED 8	RW	0
0x1010	0	Store Parameters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Save All Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	2	Save Communication Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	3	Save Application Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	4	Save Manufacturer Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	5	Save CH1-2 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	6	Save CH3-4 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	7	Save CH5-6 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	8	Save CH7-8 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1011	0	Restore Default	Max Subindex Number	UNSIGNED 8	RO	8
	1	Restore All Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	2	Restore Communication Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	3	Restore Application Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	4	Save Manufacturer Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	5	Restore CH1-2 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	6	Restore CH3-4 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	7	Restore CH5-6 Parameters	Restore not volatile parameters (Write in ASCII “load for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	8	Restore CH7-8 Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
0x1014	0	COB-ID Emergency Object	COB-ID for Emergency Object	UNSIGNED 32	RO	NODEID+0x80
0x1018	0	Identity Object	Max Subindex Number	UNSIGNED 8	RO	4
	1	Vendor ID	Seneca srl	UNSIGNED 32	RO	0x00000249
	2	Product Code	Machine ID Code	UNSIGNED 32	RO	0x0000001C
	3	Revision Number	Revision	UNSIGNED 32	RO	0
	4	Serial Number	Serial Number Code	UNSIGNED 32	RO	0
0x1200	0	Server SDO Parameters	Max Subindex Number	UNSIGNED 8	RO	2
	1	Receive SDO COB-ID	COB-ID of Receive SDO	UNSIGNED 32	RO	NODEID + 0x600
	2	Transmit SDO COB-ID	COB-ID of Transmit SDO	UNSIGNED 32	RO	NODEID + 0x580

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1801	0	Transmit PDO2 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO5	UNSIGNED 32	RW	NODEID + 0x40000280
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1802	0	Transmit PDO3 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO6	UNSIGNED 32	RW	NODEID + 0x40000380
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1803	0	Transmit PDO4 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO7	UNSIGNED 32	RW	NODEID + 0xC0000000
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
	3	Inhibit Time	Min. delay for transmit the next TxPDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1804	0	Transmit PDO5 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO8	UNSIGNED 32	RW	NODEID + 0xC0000000
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1A00	0	Transmit PDO1 Mapping	Max Subindex Number	UNSIGNED 8	RO	1
	1	Object NR1	First Object (None)	UNSIGNED 32	RO	0
0x1A01	0	Transmit PDO2 Mapping	Max Subindex Number	UNSIGNED 8	RO	4
	1	Object NR1	First Object (default:: CHANNEL 1 16 BITS INPUT)	UNSIGNED 32	RW	0x64010110 Object = 0x6401 subindex = 1 Length = 16 bit
	2	Object NR2	Second Object (default:: CHANNEL 2 16 BITS INPUT)	UNSIGNED 32	RW	0x64010210 Object = 0x6401 subindex = 2 Length = 16 bit
	3	Object NR3	Third Object (default:: CHANNEL 3 16 BITS INPUT)	UNSIGNED 32	RW	0x64010310 Object = 0x6401 subindex = 3 Length = 16 bit
	4	Object NR4	Fourth Object (default:: CHANNEL 4 16 BITS INPUT)	UNSIGNED 32	RW	0x64010410 Object = 0x6401 subindex = 4 Length = 16 bit
0x1A02	0	Transmit PDO3 Mapping	Max Subindex Number	UNSIGNED 8	RO	4
	1	Object NR1	First Object (default:: CHANNEL 5 16 BITS INPUT)	UNSIGNED 32	RW	0x64010510 Object = 0x6401 subindex = 5 Length = 16 bit
	2	Object NR2	Second Object (default:: CHANNEL 6 16 BITS INPUT)	UNSIGNED 32	RW	0x64010610 Object = 0x6401 subindex = 6 Length = 16 bit
	3	Object NR3	Third Object (default:: CHANNEL 7 16 BITS INPUT)	UNSIGNED 32	RW	0x64010710 Object = 0x6401 subindex = 7 Length = 16 bit
	4	Object NR4	Fourth Object (default:: CHANNEL 8 16 BITS INPUT)	UNSIGNED 32	RW	0x64010810 Object = 0x6401 subindex = 8 Length = 16 bit

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1A03	0	Transmit PDO4 Mapping	Max Subindex Number	UNSIGNED 8	RO	4
	1	Object NR1	First Object (default::NONE)	UNSIGNED 32	RW	0
	2	Object NR2	Second Object (default::NONE)	UNSIGNED 32	RW	0
	3	Object NR3	Third Object (default::NONE)	UNSIGNED 32	RW	0
	4	Object NR4	Fourth Object (default::NONE)	UNSIGNED 32	RW	0

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MANUFACTURER SPECIFIC PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2001	0	Module Address	Station Address (only if dip switch 4,5,6,7,8,9,10 are OFF)	UNSIGNED 8	RW	127
0x2002	0	Buad Rate	Station Baud Rate (only if dip switch 1,2,3 are OFF) 1 = 20Kbps 2 = 50Kbps 3 = 125Kbps 4 = 250Kbps 5 = 500Kbps 6 = 800Kbps 7 = 1Mbps	UNSIGNED 8	RW	7
0x2030	0	Device Temperature	Max Subindex Number	UNSIGNED 8	RO	4
	1	Internal Temperatue	Station internal Temperature [°C/10]	INTEGER 16	RO	0
	2	Hi Hi Temperature	Critical Hot Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	950
	3	Hi Temperature	Warning for Too Hot Temperature [°C/10]	INTEGER 16	RO	900
	4	Lo Temperature	Critical Low Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	-250
0x2104	0	CHANNELS CMD	Slave Command	UNSIGNED 8	RO	0
	1	CMD CH1-2	Writing 0xC0DE will return the Channel fw code into 0x2105	UNSIGNED 16	RW	0
	2	CMD CH3-4	Writing 0xC0DE will return the Channel fw code into 0x2105	UNSIGNED 16	RW	0
	3	CMD CH5-6	Writing 0xC0DE will return the Channel fw code into 0x2105	UNSIGNED 16	RW	0
	4	CMD CH7-8	Writing 0xC0DE will return the Channel fw code into 0x2105	UNSIGNED 16	RW	0
0x2105	0	CHANNELS AUX_CMD	Command Return Values	UNSIGNED 8	RO	0
	1	AUX CMD CH1-2	FW Code Return value	UNSIGNED 16	RW	0
	2	AUX CMD CH3-4	FW Code Return value	UNSIGNED 16	RW	0
	3	AUX CMD CH5-6	FW Code Return value	UNSIGNED 16	RW	0
	4	AUX CMD CH7-8	FW Code Return value	UNSIGNED 16	RW	0
0x2106	0	Channels 1-2 Parameters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Channel 1 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	2	Channel 2 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	3	Measure Type	0 = °C 1 = mV	UNSIGNED 8	RW	0
	4	Cold Junction Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	5	Line frequency Rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	6	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2
	7	TC 1 TYPE	0=J,1=K,2=R,3=S,4=T,5=B,6=E, 7=N	UNSIGNED 8	RW	0
	8	TC 2 TYPE	0=J,1=K,2=R,3=S,4=T,5=B,6=E, 7=N	UNSIGNED 8	RW	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2107	0	Channels 3-4 Parameters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Channel 3 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	2	Channel 4 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	3	Measure Type	0 = °C 1 = mV	UNSIGNED 8	RW	0
	4	Cold Junction Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	5	Line frequency Rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	6	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2
	7	TC 3 TYPE	0=J,1=K,2=R,3=S,4=T,5=B,6=E, 7=N	UNSIGNED 8	RW	0
	8	TC 4 TYPE	0=J,1=K,2=R,3=S,4=T,5=B,6=E, 7=N	UNSIGNED 8	RW	0
0x2108	0	Channels 5-6 Parameters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Channel 5 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	2	Channel 6 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	3	Measure Type	0 = °C 1 = mV	UNSIGNED 8	RW	0
	4	Cold Junction Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	5	Line frequency Rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	6	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2
	7	TC 5 TYPE	0=J,1=K,2=R,3=S,4=T,5=B,6=E, 7=N	UNSIGNED 8	RW	0
	8	TC 6 TYPE	0=J,1=K,2=R,3=S,4=T,5=B,6=E, 7=N	UNSIGNED 8	RW	0
0x2109	0	Channels 7-8 Parameters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Channel 7 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	2	Channel 8 Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	3	Measure Type	0 = °C 1 = mV	UNSIGNED 8	RW	0
	4	Cold Junction Enable	0 = disable 1 = enable	UNSIGNED 8	RW	1
	5	Line frequency Rejection	0 = 50 Hz 1 = 60 Hz	UNSIGNED 8	RW	0
	6	Filter	0 = disable, 1 = average, 2 = Hires+average, 3 = Exp lev1,..., 7 = Exp lev 5	UNSIGNED 8	RW	2
	7	TC 7 TYPE	0=J,1=K,2=R,3=S,4=T,5=B,6=E, 7=N	UNSIGNED 8	RW	0
	8	TC 8 TYPE	0=J,1=K,2=R,3=S,4=T,5=B,6=E, 7=N	UNSIGNED 8	RW	0
0x2125	0	Fault Actions mask	1 = last good 0 = load object 0x2360 Bit 7..0 Not used	UNSIGNED 8	RW	0xFF00

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2120	0	Advanced Channels Status		UNSIGNED 8	RO	0
	1	CH1-2 STATUS	ADVANCED CH1 - CH2 STATUS	UNSIGNED 16	RO	0
	2	CH3-4 STATUS	ADVANCED CH3 - CH4 STATUS	UNSIGNED 16	RO	0
	3	CH5-6 STATUS	ADVANCED CH5 - CH6 STATUS	UNSIGNED 16	RO	0
	4	CH7-8 STATUS	ADVANCED CH7 - CH8 STATUS	UNSIGNED 16	RO	0
0x2125	0	Fault Actions mask	1 = last good 0 = load object 0x2360 Bit 7..0 Not used	UNSIGNED 8	RW	0xFF00
0x2354	0	Cold Junction Temperature	Max Subindex Number	UNSIGNED 8	RO	4
	1	CH1-CH2 CJ Val	Channels 1-2 cold junction temperature [°C/10]	INTEGER 16	RO	0
	2	CH3-CH4 CJ Val	Channels 3-4 cold junction temperature [°C/10]	INTEGER 16	RO	0
	3	CH5-CH6 CJ Val	Channels 5-6 cold junction temperature [°C/10]	INTEGER 16	RO	0
	4	CH7-CH8 CJ Val	Channels 7-8 cold junction temperature [°C/10]	INTEGER 16	RO	0
0x2360	0	Fault Values	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1Fault Value	Fault Value [°C] or [mV] for Channel 1	REAL 32	RW	2000.0
	2	CH2 Fault Value	Fault Value [°C] or [mV] for Channel 2	REAL 32	RW	2000.0
	3	CH3 Fault Value	Fault Value [°C] or [mV] for Channel 3	REAL 32	RW	2000.0
	4	CH4 Fault Value	Fault Value [°C] or [mV] for Channel 4	REAL 32	RW	2000.0
	5	CH5 Fault Value	Fault Value [°C] or [mV] for Channel 5	REAL 32	RW	2000.0
	6	CH6 Fault Value	Fault Value [°C] or [mV] for Channel 6	REAL 32	RW	2000.0
	7	CH7 Fault Value	Fault Value [°C] or [mV] for Channel 7	REAL 32	RW	2000.0
	8	CH8 Fault Value	Fault Value [°C] or [mV] for Channel 8	REAL 32	RW	2000.0

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STANDARD DEVICE PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6401	0	Channels Values Integer	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 value 16Bits	Channel 1 Value [°C/10] or [mV]	INTEGER 16	RO	0
	2	CH2 value 16Bits	Channel 2 Value [°C/10] or [mV]	INTEGER 16	RO	0
	3	CH3 value 16Bits	Channel 3 Value [°C/10] or [mV]	INTEGER 16	RO	0
	4	CH4 value 16Bits	Channel 4 Value [°C/10] or [mV]	INTEGER 16	RO	0
	5	CH5 value 16Bits	Channel 5 Value [°C/10] or [mV]	INTEGER 16	RO	0
	6	CH6 value 16Bits	Channel 6 Value [°C/10] or [mV]	INTEGER 16	RO	0
	7	CH7 value 16Bits	Channel 7 Value [°C/10] or [mV]	INTEGER 16	RO	0
	8	CH8 value 16Bits	Channel 8 Value [°C/10] or [mV]	INTEGER 16	RO	0
0x6403	0	Channels Values Real	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 value Real	Channel 1 Value [°C/10] or [mV]	REAL 32	RO	0
	2	CH2 value Real	Channel 2 Value [°C/10] or [mV]	REAL 32	RO	0
	3	CH3 value Real	Channel 3 Value [°C/10] or [mV]	REAL 32	RO	0
	4	CH4 value Real	Channel 4 Value [°C/10] or [mV]	REAL 32	RO	0
	5	CH5 value Real	Channel 5 Value [°C/10] or [mV]	REAL 32	RO	0
	6	CH6 value Real	Channel 6 Value [°C/10] or [mV]	REAL 32	RO	0
	7	CH7 value Real	Channel 7 Value [°C/10] or [mV]	REAL 32	RO	0
	8	CH8 value Real	Channel 8 Value [°C/10] or [mV]	REAL 32	RO	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6423	0	Analogue Input Interrupt Global Enable	0 = Disable asynchronous TxPDO 1 = Enable asynchronous TxPDO	BOOLEAN	RW	0
0x6424	0	Integer Analogue Interrupt Upper Limit	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt upper value	Channel 1 integer analogue interrupt upper limit value [°C/10] or [mV]	INTEGER16	RW	20000
	2	CH2 Interrupt upper value	Channel 2 integer analogue interrupt upper limit value [°C/10] or [mV]	INTEGER16	RW	20000
	3	CH3 Interrupt upper value	Channel 3 integer analogue interrupt upper limit value	INTEGER16	RW	20000
	4	CH4 Interrupt upper value	Channel 4 integer analogue interrupt upper limit value [°C/10] or [mV]	INTEGER16	RW	20000
	5	CH5 Interrupt upper value	Channel 5 integer analogue interrupt upper limit value [°C/10] or [mV]	INTEGER16	RW	20000
	6	CH6 Interrupt upper value	Channel 6 integer analogue interrupt upper limit value [°C/10] or [mV]	INTEGER16	RW	20000
	7	CH7 Interrupt upper value	Channel 7 integer analogue interrupt upper limit value [°C/10] or [mV]	INTEGER16	RW	20000
	8	CH8 Interrupt upper value	Channel 8 integer analogue interrupt upper limit value [°C/10] or [mV]	INTEGER16	RW	20000
0x6425	0	Integer Analogue Interrupt lower Limit	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt lower value	Channel 1 integer analogue interrupt lower limit value [°C/10] or [mV]	INTEGER16	RW	-250
	2	CH2 Interrupt lower value	Channel 2 integer analogue interrupt lower limit value [°C/10] or [mV]	INTEGER16	RW	-250
	3	CH3 Interrupt lower value	Channel 3 integer analogue interrupt lower limit value [°C/10] or [mV]	INTEGER16	RW	-250
	4	CH4 Interrupt lower value	Channel 4 integer analogue interrupt lower limit value [°C/10] or [mV]	INTEGER16	RW	-250
	5	CH5 Interrupt lower value	Channel 5 integer analogue interrupt lower limit value [°C/10] or [mV]	INTEGER16	RW	-250
	6	CH6 Interrupt lower value	Channel 6 integer analogue interrupt lower limit value [°C/10] or [mV]	INTEGER16	RW	-250
	7	CH7 Interrupt lower value	Channel 7 integer analogue interrupt lower limit value [°C/10] or [mV]	INTEGER16	RW	-250
	8	CH8 Interrupt lower value	Channel 8 integer analogue interrupt lower limit value [°C/10] or [mV]	INTEGER16	RW	-250

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6426	0	Unsigned Analogue Interrupt Delta	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt delta value	Channel 1 unsigned analogue interrupt delta value [°C/10] or [mV]	UNSIGNED 16	RW	10
	2	CH2 Interrupt delta value	Channel 2 unsigned analogue interrupt delta value [°C/10] or [mV]	UNSIGNED 16	RW	10
	3	CH3 Interrupt delta value	Channel 3 unsigned analogue interrupt delta value [°C/10] or [mV]	UNSIGNED 16	RW	10
	4	CH4 Interrupt delta value	Channel 4 unsigned analogue interrupt delta value	UNSIGNED 16	RW	10
	5	CH5 Interrupt delta value	Channel 5 unsigned analogue interrupt delta value [°C/10] or [mV]	UNSIGNED 16	RW	10
	6	CH6 Interrupt delta value	Channel 6 unsigned analogue interrupt delta value [°C/10] or [mV]	UNSIGNED 16	RW	10
	7	CH7 Interrupt delta value	Channel 7 unsigned analogue interrupt delta value [°C/10] or [mV]	UNSIGNED 16	RW	10
	8	CH8 Interrupt delta value	Channel 8 unsigned analogue interrupt delta value [°C/10] or [mV]	UNSIGNED 16	RW	10
0x6429	0	Float Analogue Interrupt upper Limit	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt upper value	Channel 1 float analogue interrupt upper limit value [°C] or [mV]	REAL 32	RW	2000.0
	2	CH2 Interrupt upper value	Channel 2 float analogue interrupt upper limit value [°C] or [mV]	REAL 32	RW	2000.0
	3	CH3 Interrupt upper value	Channel 3 float analogue interrupt upper limit value [°C] or [mV]	REAL 32	RW	2000.0
	4	CH4 Interrupt upper value	Channel 4 float analogue interrupt upper limit value [°C] or [mV]	REAL 32	RW	2000.0
	5	CH5 Interrupt upper value	Channel 5 float analogue interrupt upper limit value [°C] or [mV]	REAL 32	RW	2000.0
	6	CH6 Interrupt upper value	Channel 6 float analogue interrupt upper limit value [°C] or [mV]	REAL 32	RW	2000.0
	7	CH7 Interrupt upper value	Channel 7 float analogue interrupt upper limit value [°C] or [mV]	REAL 32	RW	2000.0
	8	CH8 Interrupt upper value	Channel 8 float analogue interrupt upper limit value [°C] or [mV]	REAL 32	RW	2000.0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x642A	0	Float Analogue Interrupt lower Limit	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt lower value	Channel 1 float analogue interrupt lower limit value [°C] or [mV]	REAL 32	RW	-250.0
	2	CH2 Interrupt lower value	Channel 2 float analogue interrupt lower limit value [°C] or [mV]	REAL 32	RW	-250.0
	3	CH3 Interrupt lower value	Channel 3 float analogue interrupt lower limit value [°C] or [mV]	REAL 32	RW	-250.0
	4	CH4 Interrupt lower value	Channel 4 float analogue interrupt lower limit value	REAL 32	RW	-250.0
	5	CH5 Interrupt lower value	Channel 5 float analogue interrupt lower limit value [°C] or [mV]	REAL 32	RW	-250.0
	6	CH6 Interrupt lower value	Channel 6 float analogue interrupt lower limit value [°C] or [mV]	REAL 32	RW	-250.0
	7	CH7 Interrupt lower value	Channel 7 float analogue interrupt lower limit value [°C] or [mV]	REAL 32	RW	-250.0
	8	CH8 Interrupt lower value	Channel 8 float analogue interrupt lower limit value [°C] or [mV]	REAL 32	RW	-250.0
0x642B	0	Float Analogue Interrupt Delta	Max Subindex Number	UNSIGNED 8	RO	8
	1	CH1 Interrupt Delta value	Channel 1 float analogue interrupt delta value [°C] or [mV]	REAL 32	RW	0
	2	CH2 Interrupt Delta value	Channel 2 float analogue interrupt delta limit value [°C] or [mV]	REAL 32	RW	0
	3	CH3 Interrupt Delta value	Channel 3 float analogue interrupt delta limit value [°C] or [mV]	REAL 32	RW	0
	4	CH4 Interrupt Delta value	Channel 4 float analogue interrupt delta limit value [°C] or [mV]	REAL 32	RW	0
	5	CH5 Interrupt Delta value	Channel 5 float analogue interrupt delta limit value [°C] or [mV]	REAL 32	RW	0
	6	CH6 Interrupt Delta value	Channel 6 float analogue interrupt delta limit value [°C] or [mV]	REAL 32	RW	0
	7	CH7 Interrupt Delta value	Channel 7 float analogue interrupt delta limit value [°C] or [mV]	REAL 32	RW	0
	8	CH8 Interrupt Delta value	Channel 8 float analogue interrupt delta limit value [°C] or [mV]	REAL 32	RW	0

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EN

ZC - SG

CANopen I/O Module
Strain Gauge
Converter

User Manual

Contents:

Features
PDOs
Emergency Message
Manufacturer Specific Objects
Led Description
Objects for Analog Data
Dip Switch Configuration
Interrupt Objects
Functional Diagrams
Object Dictionary

FEATURES

TECHNICAL DATA	
Baud rate	20, 50, 125, 250, 500, 800, 1000 Kbits/s
Typical Refresh Time	20 ms
Sensibility supported	From ±1 mV/V to ± 64 mV/V
CANopen TECHNICAL DATA	
NMT	SLAVE
ERROR CONTROL	NODE GUARDING
NODE ID	HW SWITCH OR SOFTWARE
NUMBER OF PDO	2 TX
PDO MODES	Event Triggered, Sync (cyclic), Sync (acyclic)
PDO MAPPING	VARIABLE
PDO LINKING	SUPPORTED
NUMBER OF SDO	1 SERVER
ERROR MESSAGE	YES
SUPPORTED APPLICATION LAYER	CiA 301 v4.02
SUPPORTED PROFILE	CiA 401 v2.01

TPDO TRANSMISSIONS TYPE SUPPORTED

OBJECT VALUE 0x180x sub 2	TRANSMISSION TYPE
0	Synchronous - acyclic
From 1 to 240	Synchronous - cyclic
254	Asynchronous (Trigger on “Stable Weight” condition) Manufacturer Specific

PDOs MAPPING

OBJECTS FOR DEFAULT MAPPING				
PDO NR	COB-ID	MAPPED OBJECT	INDEX	SUBINDEX
TPDO 2	0x40000280 + NodeId	Measure Float	0x6403	1
		ADC 16 bit	0x6401	2
TPDO 3	0x40000380 + NodeId	Measure Integer	0x6401	1
		STATUS	0x2120	0

Note that a TPDO COB-ID must start with 0x4

EMERGENCY MESSAGE

The Emergency message is composed by:
2 bytes of EEC (Emergency Error Code)
1 byte of ER (Error register)
At least 4 bytes of MEF (Manufacturer Error Filed Object 0x1002)

EEC (Emergency Error Code)	
CODE	DESCRIPTION
0x0000	No Error
0x1000	Generic error
0x4201	CPU Temperature over HOT STOP ERROR
0x4202	CPU Temperature over HOT STOP
0x4203	CPU Temperature under COLD ERROR
0x8110	Communication Can Overrun
0x8120	Error Passive
0x8130	Life Guard Error
0x8140	Recovered From Bus Off
0xFF10	General Input Channel Error
0xFF11	Command for Input Channel Error
0xFF20	CPU Error

ER (Error Register)							
BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT1	BIT 0
Generic	0	0	Temperature	Communication	0	0	Manifacturer

Where if a bit is 0 means no error

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For EEC code 0xFF10 the EMERGENCY MESSAGE is:

EMERGENCY MESSAGE				
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4
0xFF10		0x81	**MEF**	

With this MEF:

MEF (Manufacturer-specific Error Field) for EEC 0xFF10	
BIT	DESCRIPTION
15..6	NA
5	Generic Communication with input ERROR
4	CRC Communication with input ERROR
3	EEPROM Error
2	Over Weight ERROR
1	Weight Float < 0
0	Stable Weight

For "CPU ERROR" the Emergency Message will be:

EMERGENCY MESSAGE						
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4	**BYTE 5**	BYTE 6
0xFF20		0X81	**Object 0x1002**			

For "Timeout command" or "Error Command" the Emergency Message will be:

EMERGENCY MESSAGE				
BYTE 0	BYTE 1	**BYTE 2**	BYTE 3	BYTE 4
0xFF11		0x81	**Object 0x2103**	

OBJECT 0x1002 MANUFACTURER STATUS REGISTER

Object 0x1002 is the CPU status.

OBJECT 0x1002 : MANUFACTURER STATUS REGISTER	
BIT	DESCRIPTION
31..3	NA
2	Communication with input error
1	NA
0	EEPROM CRC error

OBJECT 0x1006 COMMUNICATION WINDOW LENGTH

OBJECT 0x1006 : COMMUNICATION WINDOW LENGTH	
MIN VAL [ms]	MAX VAL [ms]
10	10000

OBJECT 0x1007 SYNCHRONOUS WINDOW LENGTH

OBJECT 0x1007 : SYNCHRONOUS WINDOW LENGTH	
MIN VAL [ms]	MAX VAL [ms]
2	2000

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MANUFACTURE SPECIFIC PROFILE AREA

OBJECT 0x2001 NODE ADDRESS

If Hardware switches are in "from memory" mode the node address is selectable by object 0x2001.

NODE ADDRESS (Object 0x2001)	
OBJECT VALUE	DESCRIPTION
0..127	Node Address

OBJECT 0x2002 BAUD RATE

If Hardware switches are in "from memory" mode the baud rate is selectable by object 0x2002.

BAUD RATE (Object 0x2002)	
OBJECT VALUE	DESCRIPTION
1	20 Kbit/s
2	50 Kbit/s
3	125 Kbit/s
4	250 Kbit/s
5	500 Kbit/s
6	800 Kbit/s
7	1 Mbit/s

OBJECT 0x2030 CPU TEMPERATURE

Object can be used for monitoring the CPU temperature. The HOT STOP Temperature sends in pre-operational the station.

The HOT ERROR and the COLD ERROR Temperature sends the Emergency Object.

The Object is Read Only.

CPU TEMPERATURE (Object 0x2030)	
SUBINDEX	DESCRIPTION
1	Actual Temperature [°C/10]
2	Temperature for HOT STOP ERROR [°C/10] 95.0°C
3	Temperature for HOT ERROR [°C/10] 90.0°C
4	Temperature for COLD ERROR [°C/10] -25.0°C

DIGITAL OUT LOGIC

Digital out Logic = 0 the digital output it's normally opened.
Digital out Logic = 1 the digital output it's normally closed.

OBJECT 0x2104 EXECUTE

The object sends command to the CPU: the supported commands are:

COMMANDS SUPPORTED (Object 0x2104)	
COMMAND CODE	DESCRIPTION
0xC2FA	TARE ACQUISITION READY FOR TO BE SAVED IN EEPROM
0xC60C	FULL SCALE/KNOWN WEIGHT ACQUISITION READY FOR TO BE SAVED IN EEPROM
0xC1BA	TARE ACQUISITION (ON RAM)
0xD180	FULL SCALE ACQUISITION (ON RAM)
0xBAB0	SAVE NEW VALUES ON EEPROM

OBJECT 0x2105: EXECUTE RESULT

The object is used to know the command execution result (only for special commands).

OBJECT 0x2107: CONFIGURATION REGISTER 1

The object is used to setup the measure and the digital output/input.

CONFIGURATION REGISTER 1 (Object 0x2107)	
SUBINDEX	DESCRIPTION
1	Sample Number
2	Mode
3	Cell Sensibility
4	Digital Out Logic
5	Digital Out mode
6	Digital In or Out selection

SAMPLE NR

The Sample Number it' s the number of sample that enters into the measure. Higher values implies lower response speed but more stability.

MODE

The station can be configured in two modes:
Mode = 1 A known weight must be used to calibrate the system on site.
Mode = 0 No need to use a known weight to calibrate the system, the station will use the factory calibration values.

CELL SENSIBILITY

The Object sets the Cell mV/V Sensibility:
0 = +- 1mV/V
1 = +- 2mV/V
2 = +- 4mV/V
3 = +- 8mV/V
4 = +- 16mV/V
5 = +- 32mV/V
6 = +- 64 mV/V
7 = From Object 0x2108 sub 1

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DIGITAL OUT LOGIC

Defines the operation that will cause the switch to ON or OFF for the digital output.

DIGITAL OUT LOGIC	
VALUE	DESCRIPTION
0	The output is normally opened
1	The output is normally closed

DIGITAL OUT MODE

Defines the operation that will cause the switch to ON or OFF for the digital output.

DIGITAL OUT MODE	
VALUE	DESCRIPTION
0	The Gross Weight exceeds the Full Scale
1	The weight is stable and the net weight exceeds the threshold set.
2	The weight it's stable

DIGITAL IN OR OUT SELECTION

The station can be configured with a digital input or a digital output:.
If in or out selection = 1 digital output enable / digital input disabled.
In or out selectiojn = 0 digital input enable / digital output disabled.

OBJECT 0x2108: CONFIGURATION REGISTER 2

The object is used to setup the system measure.

CONFIGURATION REGISTER 2 (Object 0x2108)	
SUBINDEX	DESCRIPTION
1	Sense Ratio
2	Cell Full Scale
3	Known Weight value
4	Value for Maximum Integer
5	Value for Minimun Integer
6	Threashold Value
7	Δ weight
8	Δ time
9	ADC Speed
10	Resolution in Number of Point s

SENSE RATIO

Sets the sense ratio for the strain gauge used in [mV/V] (Floating point 32bit format).

CELL FULL SCALE

If mode 1 it's selected (object 0x2107) sets the full scale of the strain gauge in technical units of weight (kg, pounds, etc) (Floating point 32 bit format).

KNOWN WEIGHT VALUE

If mode 1 it's selected (object 0x2107) sets the value of the weight used for the calibration in technical units (kg, pounds, etc) (Floating point 32bit format).

Value for Maximum Integer

Sets for what Net Weight (object 0x6403) the Integer net Value (object 0x6401 subindex 1) rise the +30000 value. (Floating point 32 bit format).

Value for Minimum Integer

Sets for what Net Weight (object 0x6403) the Integer net Value (object 0x6401 subindex 1) rise the zero value. (Floating point 32 bit format).

Threshold value

If the net weight exceeds the threshold value set and the weight is stable, the digital output (if subindex digital out mode = 1) is closed or opened (depending subindex digital output logic).(Floating point 32 bit format).

Δ Weight

Weight variation in technical units accepted for the condition of "stable weight". (Floating point 32 bit format).

Δ Time

Time in units of 100 ms used with Δ weight to establish whether or not the weight is stable. [s/10].

ADC Speed

The ADC speed and the frequency rejection cab be customized by the table:

ADC CONFIGURATION			
VALUE	SAMPLING FREQUENCY [Hz]	50Hz Rejection	60Hz Rejection
27	151.71	NO	NO
55	74.46	NO	NO
82	49.95	YES	YES
109	37.59	NO	YES
155	50.57	**NO**	NO
183	24.82	YES	NO
210	16.65	YES	YES
237	12.53	NO	YES

Hysteresis

The hysteresis can be used to stabilize the input value. If the hysteresis is activated the resolution is limited to +- 30000 points. If hysteresis is disabled the resolution avaible is the full 24 bits ADC.

0x00 = hysteresis disabled
0x80 = hysteresis enabled

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OBJECT 0x2120 STATUS

The status object contains important information about the state of the measure and the station. The "stable weight" bit it's used like interrupt source for asynchronous TPDO.

STATUS (OBJECT 0x2120)	
BIT	DESCRIPTION
15..5	NA
6	Net Weight > Threshold
5	Generic Communication with input channel ERROR
4	CRC Communication with input channel ERROR
3	EEPROM Error
2	Over weight ERROR
1	Negative Measure
0	Stable Weight Condition

DIP SWITCH CONFIGURATION

DIP-SWITCH SETTINGS
(CANopen PROTOCOL)

KEY
ON

BAUD RATE		ADDRESS	
1 2 3 SOFTWARE PROGRAMMED		4 5 6 7 8 9 10	SOFTWARE PROGRAMMED
	20 kbps	0000001	ADD. 001
	50 kbps	0000010	ADD. 002
	125 kbps	0000011	ADD. 003
	250 kbps	0000100	ADD. 004
	500 kbps	0000101	ADD. 005
	800 kbps	.....	.....
	1 Mbps	1111111	ADD. 127

LED DESCRIPTION

SERVICE LED DESCRIPTION		
LED	STATE	DESCRIPTION
RUN	BLINKING	Pre-operational mode
	SINGLE FLASH	Stop mode
	ON	Operational mode
ERROR	SINGLE FLASH	At least one error counter has reached or exceeded the warning level
	DOUBLE FLASH	Guard Event
	TRIPLE FLASH	The SYNC hasn't received within the configurated communication cycle time out period
	ON	The Can controller is BUS OFF
	OFF	No error
FAIL	BLINKING	Data receiving from front jack / Overweight Error
	ON	Communication Error with Input Channel
POWER	ON	Power Supply

OBJECTS FOR ANALOG DATA

OBJECT 0x6401 16 BIT INPUT VALUE

Object 0x6401 contains the 16 bit (signed) values for the weight and the unsigned 16 bit ADC value.

16 BIT INTEGER INPUT (OBJECT 0x6401)	
SUBINDEX	DESCRIPTION
1	Net Value signed. (-30000, +30000)
2	ADC Value

INTEGER NET VALUE

Integer net value (signed) ±30000 scale.

ADC VALUE

The ADC value scaled into16 bit (unsigned) value.
Where if ADC = 0x8000 means 0 mV on input.
If ADC = 0xFFFF means max positive mV on input.
If ADC = 0 means max negative mV on input.

OBJECT 0x6403 32 BIT FLOAT INPUT VALUE

Object 0x6403 contains the net weight in technical unit in agreement with the Known Weight object (floating point 32 bits format).

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CELL CALIBRATION PROCEDURE FOR MODE = 1 (CALIBRATION WITH A KNOWN WEIGHT)

1) Set the right mV/V sensibility on object 0x2107 subindex 3
2) Save the new value by sending the command 0xBAB0 on object 0x2104 subindex 0
3) Send the Reset command by sending command 0xABAC on object 0x2104 subindex 0
4) Put the Tare on the cell
5) Get the Tare value by sending the command 0xC2FA on object 0x2104 subindex 0
6) Enter the known weight value in technical units (kg, pounds, etc) on object 0x2108 subindex 3
7) Put the known weight value on the cell
8) Get the known weight by sending the command 0xC60C on object 0x2104 subindex 0
9) Save the new values by sending the command 0xBAB0 on object 0x2104 subindex 0
10) Wait 5 seconds and Switch OFF and then ON the ZC-SG

CELL CALIBRATION PROCEDURE FOR MODE = 0 (CALIBRATION WITHOUT A KNOWN WEIGHT)

1) Set the value 7 on object 0x2107 subindex 3 (use object 2108 for sense ratio)
2) Set the right mV/V sensibility on object 0x2108 subindex 1 in floating point value
3) Save the new values by sending the command 0xBAB0 on object 0x2104 subindex 0
4) Send the Reset command by sending command 0xABAC on object 0x2104 subindex 0
5) Put the Tare on the cell
6) Get the Tare value by sending the command 0xC2FA on object 0x2104 subindex 0
7) Save the new values by sending the command 0xBAB0 on object 0x2104 subindex 0
8) Wait 5 seconds and Switch OFF and then ON the ZC-SG

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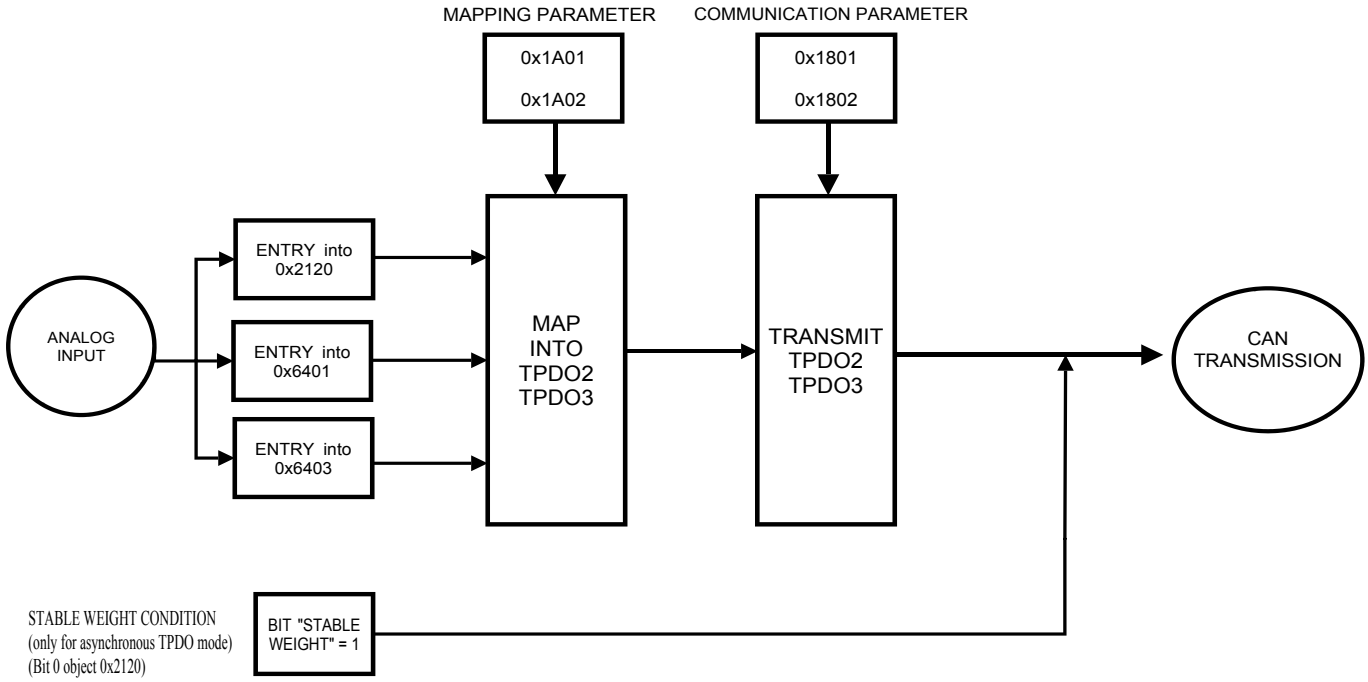
FUNCTIONAL DIAGRAM



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OBJECT DICTIONARY

COMMUNICATION PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1000	0	Device Type	Device Type (Profile 401 = 0x191)	UNSIGNED 32	RO	0x00040191
0x1001	0	Error register	Error register (DS 401)	UNSIGNED 8	RO	0
0x1002	0	Manufacturer Status Register	Status Register	UNSIGNED 32	RO	0
0x1005	0	SYNC COB-ID	The device consumes the SYNC message	UNSIGNED 32	RW	0x80
0x1006	0	Communication Window Length	Sync interval [us]	UNSIGNED 32	RW	0
0x1007	0	Synchronous Window Length	Time window [us] for the PDO transmission after the SYNC	UNSIGNED 32	RW	0
0x1008	0	Manufacturer Device name	Device name	VISIBLE STRING	RO	“ZC-SG”
0x1009	0	Manufacturer Hardware Version	Hardware version	VISIBLE STRING	RO	“SC000000”
0x100A	0	Manufacturer Software Version	Software version	VISIBLE STRING	RO	“SW001160”
0x100C	0	Guard Time	Guard Time [ms]	UNSIGNED 16	RW	0
0x100D	0	Life Time Factor	Max delay between two guarding telegrams = Guard_Time*Life_Time_Factor	UNSIGNED 8	RW	0
0x1010	0	Store Parameters	Max Subindex Number	UNSIGNED 8	RO	8
	1	Save All Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	2	Save Communication Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	3	Save Application Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	4	Save Manufacturer Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	5	Save CH1-2 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	6	Save CH3-4 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	7	Save CH5-6 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	8	Save CH7-8 Parameters	Store not volatile parameters (Write in ASCII “save” for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1011	0	Restore Default	Max Subindex Number	UNSIGNED 8	RO	5
	1	Restore All Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	2	Restore Communication Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	3	Restore Application Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	4	Save Manufacturer Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	5	Restore Channel Parameters	Restore not volatile parameters (Write in ASCII “load” for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
0x1014	0	COB-ID Emergency Object	COB-ID for Emergency Object	UNSIGNED 32	RO	NODEID+0x80
0x1018	0	Identity Object	Max Subindex Number	UNSIGNED 8	RO	4
	1	Vendor ID	Seneca srl	UNSIGNED 32	RO	0x00000249
	2	Product Code	Machine ID Code	UNSIGNED 32	RO	0x0000001F
	3	Revision Number	Revision	UNSIGNED 32	RO	0
	4	Serial Number	Serial Number Code	UNSIGNED 32	RO	0
0x1200	0	Server SDO Parameters	Max Subindex Number	UNSIGNED 8	RO	2
	1	Receive SDO COB-ID	COB-ID of Receive SDO	UNSIGNED 32	RO	NODEID + 0x600
	2	Transmit SDO COB-ID	COB-ID of Transmit SDO	UNSIGNED 32	RO	NODEID + 0x580

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1801	0	Transmit PDO2 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO 2	UNSIGNED 32	RW	NODEID + 0x40000280
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFE = Asynchronous Manufacturer Specific	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000
0x1802	0	Transmit PDO 3 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of TxPDO 3	UNSIGNED 32	RW	NODEID + 0x40000380
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous-cyclic 0xFE = Asynchronous Manufacturer Specific	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Min. delay for the next PDO (ms/10)	UNSIGNED 16	RW	0x0000

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1A01	0	Transmit PDO2 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default: WEIGHT FLOAT)	UNSIGNED 32	RW	0x64030120 Object = 0x6403 subindex = 1 Length = 32 bit
	2	Object NR2	Second Object (default: ADC 16 Bit Value)	UNSIGNED 32	RW	0x64010210 Object = 0x6401 subindex = 2 Length = 16 bit
0x1A02	0	Transmit PDO3 Mapping	Max Subindex Number	UNSIGNED 8	RO	2
	1	Object NR1	First Object (default: WEIGHT INTEGER)	UNSIGNED 32	RW	0x64010110 Object = 0x6401 subindex = 1 Length = 16 bit
	2	Object NR2	Third Object (default: STATUS)	UNSIGNED 32	RW	0x21200010 Object = 0x2120 subindex = 0 Length = 16 bit

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MANUFACTURER SPECIFIC PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2001	0	Module Address	Station Address (only if dip switch 4,5,6,7,8,9,10 are OFF)	UNSIGNED 8	RW	127
0x2002	0	Buad Rate	Station Baud Rate (only if dip switch 1,2,3 are OFF) 1 = 20Kbps 2 = 50Kbps 3 = 125Kbps 4 = 250Kbps 5 = 500Kbps 6 = 800Kbps 7 = 1Mbps	UNSIGNED 8	RW	7
0x2030	0	Device Temperature	Max Subindex Number	UNSIGNED 8	RO	4
	1	Internal Temperatue	Station internal Temperature [°C/10]	INTEGER 16	RO	0
	2	Hi Hi Temperature	Critical Hot Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	950
	3	Hi Temperature	Warning for Too Hot Temperature [°C/10]	INTEGER 16	RO	900
	4	Lo Temperature	Critical Low Temperature (All operations Stop) [°C/10]	INTEGER 16	RO	-250
0x2104	0	Execute	SUPPORTED CAMMANDS: 0xC2FA = TARE ACQUISITION (READY FOR EEPROM SAVING) 0xC60C = FULL SCALE ACQUISITION (READY FOR EEPROM SAVING) 0xC1BA = TARE ACQUISITION (RAM) 0xD180 = FULL SCALE ACQUISITION (RAM) 0xBAB0 = SAVE VALUES IN EEPROM	UNSIGNED 16	RW	0
0x2105	0	Special Command Execute result	0 = command done 1 = command executed with error	UNSIGNED 16	RW	0
0x2107	0	Configuration Parameters 1	Max Subindex Number	UNSIGNED 8	RO	6
	1	Average Sample Number	Number of Samples for filter calculation [1..100]	UNSIGNED 8	RW	100
	2	Measure type	0 = Use the factory calibration 1 = Use a Known Weight	UNSIGNED 8	RW	1
	3	Cell Sensibility	0 = +- 1mV/V 1 = +- 2mV/V 2 = +- 4mV/V 3 = +- 8mV/V 4 = +- 16mV/V 5 = +- 32mV/V 6 = +- 64mV/V 7 = From Object 0x2108 sub 1	UNSIGNED 8	RW	1
	4	Digital OUT logic	0 = the output is normally open 1 = the input is normally close	UNSIGNED 8	RW	0
	5	Digital OUT Operation mode	0 = The output is switched when the Gross_Weight > Full_Scale 1 = The output is switched when the weight is stable AND the net weight > Threshold 2 = The output is switched when the weight it's stable	UNSIGNED 8	RW	0
	6	Digital IN or OUT mode	0 = digital input mode 1 = digital output mode	UNSIGNED 8	RW	0

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INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2108	0	Configuration Parameters 2	Max Subindex Number	UNSIGNED 8	RO	10
	1	Sense Ratio	Cell Sense Ratio In mV/V unit measure	REAL 32	RW	2.0
	2	Cell Full Scale		REAL 32	RW	10000.0
	3	Known Weight	Known Weight in [kg, g, etc...]	REAL 32	RW	10000.0
	4	FullScale for integer value	Weight associated to the +30000 integer scale value	REAL 32	RW	10000.0
	5	Start Scale for integer value	Weight associated to the 0 integer scale value	REAL 32	RW	0.0
	6	Threshold		REAL 32	RW	0.0
	7	ΔWeight	Weight variation for the “stable condition”	REAL 32	RW	1.0
	8	ΔTime	Time variation used for the “stable condition” Δtime*100ms	UNSIGNED 8	RW	1
	9	ADC sampling frequency	27 = 151.71 Hz 55 = 74.46 Hz 82 = 49.95 Hz 109 = 37.59 Hz 155 = 50.57 Hz 183 = 24.82 Hz 210 = 16.65 Hz 237 = 12.53 Hz	UNSIGNED 8	RW	82
	10	Hysteresis	0x00 = hysteresis disabled 0x80 = +-30000 points hysteresis enabled	UNSIGNED 8	RW	0x00
0x2120	0	Status	Status Object	UNSIGNED 16	RO	0

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STANDARD DEVICE PROFILE AREA

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6401	0	Channels Values Integer	Max Subindex Number	UNSIGNED 8	RO	2
	1	Weight signed	Weight in +-30000 scale	INTEGER 16	RO	0
	2	ADC value (SCALED to 16 bits)	ADC scaled value	UNSIGNED 16	RO	0
0x6403	0	Channels Values Real	Max Subindex Number	UNSIGNED 8	RO	1
	1	Weight Real	Weight in Real Format	REAL 32	RO	0

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